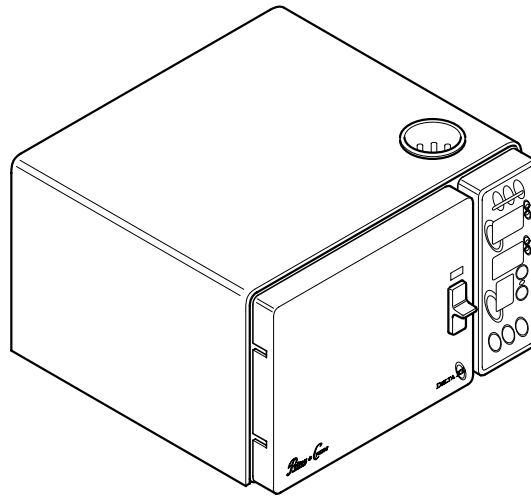
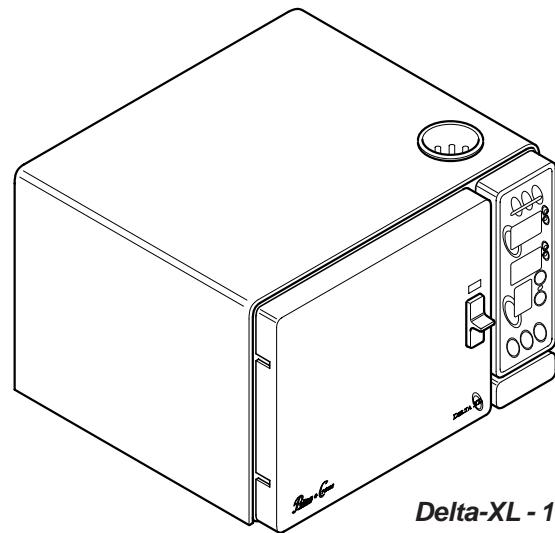


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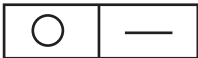














*Delta-XL - 8"*



*Delta-XL - 10"*

## Product Information

### Table of Symbols

	On/Off Power Switch		Clear/Start
	Power		Program
	Ground		Hot Surface
	Mode		Low Water
	Printer Connection		Dry
	Printer On/Off		Ready
	Arrows		Sterilize
	Attention: Printer Connection Only		



The conformity of the quality management system is certified with Certificate No. 369CE, dated April 8, 1999 by:

**AMTAC Certification Services, LTD**

Norman Road, Broadheath, Altrincham

Cheshire WA 14 4EP, United Kingdom

The identification number of the notified body for implementation of the procedure set out in Annex V of the Directive is 0473.

The authorized representative :

**Medical Device & QA Services**

76, Stockport Road

Timperley

Cheshire

WA15 7SN

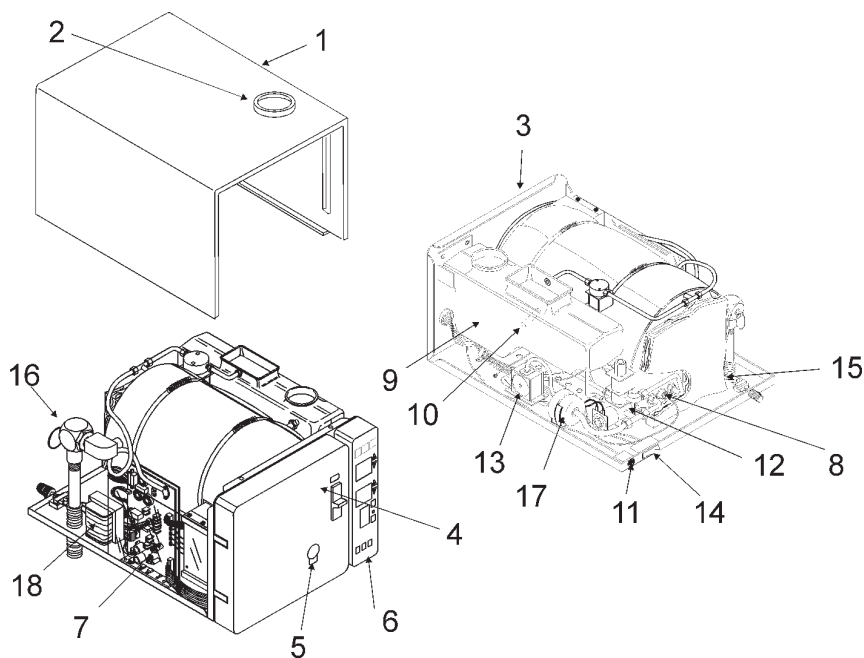
United Kingdom

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## Visual Index

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- 1 Casing with Plumbing Diagram (inside cover)
- 2 Fill
- 3 Front Frame
- 4 Door with Lock
- 5 Drain (quick connection behind door)
- 6 Front Panel Microprocessor MPU
- 7 Power PCB
- 8 RTD (Steam) Sensor
- 9 Reservoir with Overflow Vent
- 10 Water Level Switch (inside reservoir)
- 11 Printer Jack
- 12 Solenoids
- 13 Drying Pump
- 14 Master Power Switch
- 15 Heating Element (mounted on bottom of chamber)
- 16 Safety Valve
- 17 Filter
- 18 Transformer

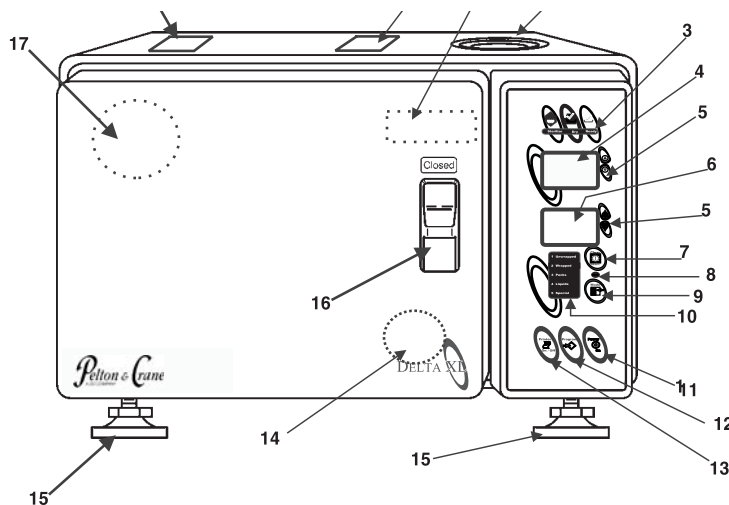


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## Operating Features

---

1. Power Switch/Circuit Breaker (rear of unit)
2. Reservoir Fill
3. Operation Indicator Light
4. Display Window (Pressure) kPa
5. Arrow Switches
6. Display Window (Temp/Time) C/F / Minutes
7. Clear/Start Switch
8. Low Water Light
9. Mode Selection Switch
10. Mode/Program Display
11. Power On Switch
12. Programming Switch
13. Printer On/Off Switch
14. Quick Drain Connection (inside door)
15. Leveling Feet
16. Door Lock
17. Safety Valve (rear corner of unit)
18. Operating Instructions Label
19. Caution Label
20. Serial Number Plate (inside door)



---

## Safety Features

---

The design of the autoclave has these safety features for your protection:

### Door Lock

Door can be opened only when internal pressure is at atmospheric pressure.

### Vent Valve

The vent valve will open and the P-2 alarm will display should the chamber pressure exceed 240 kPa.

### Safety Valve

The safety valve opens as backup protection should the chamber pressure exceed 262 kPa.

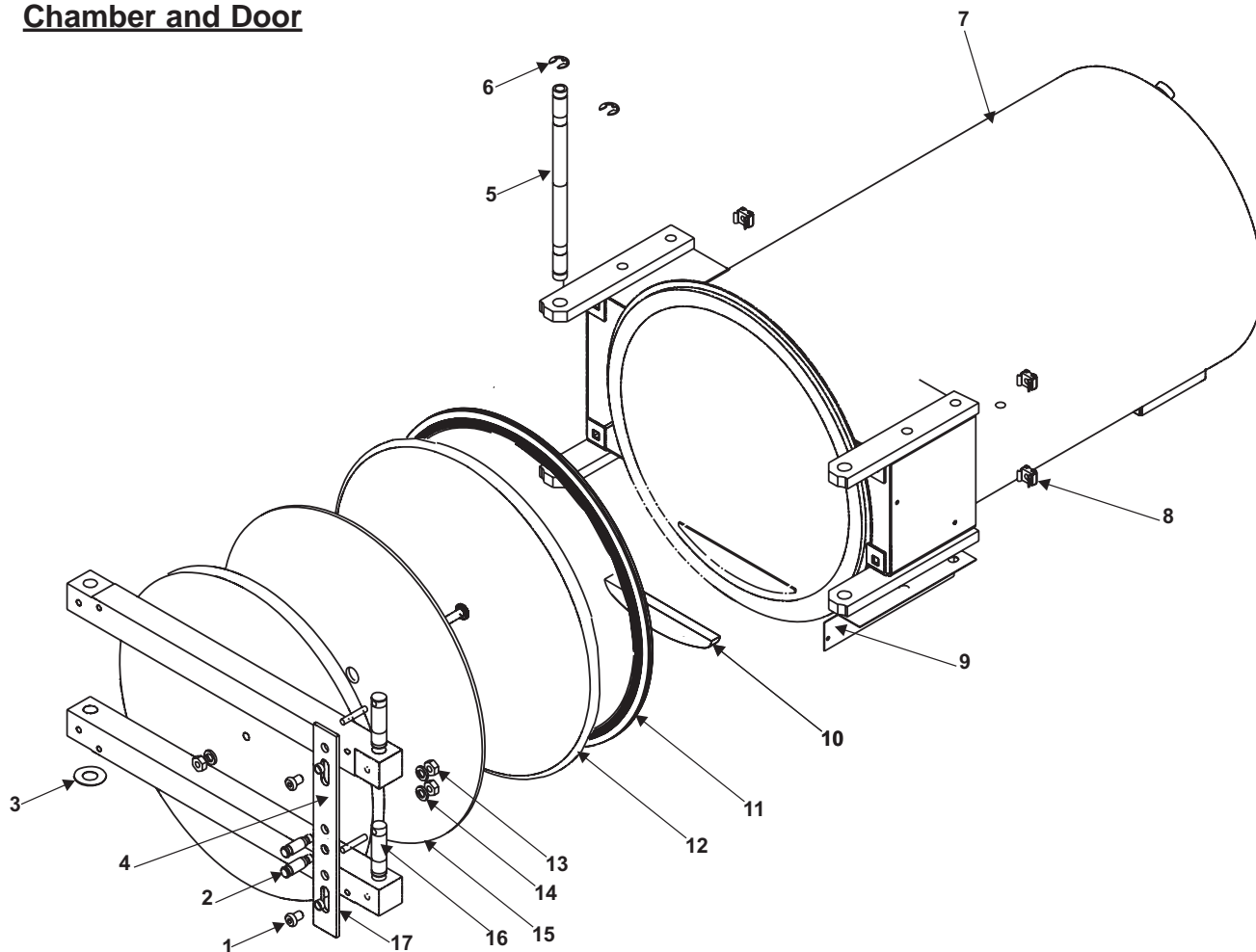
### Overheat Protection

Chamber temperature is protected with a surface sensor so the temperature will not exceed 159°C. It has additional overheat protection should the temperature of the heating elements reach 180°C.

### Electrical Power Interruption

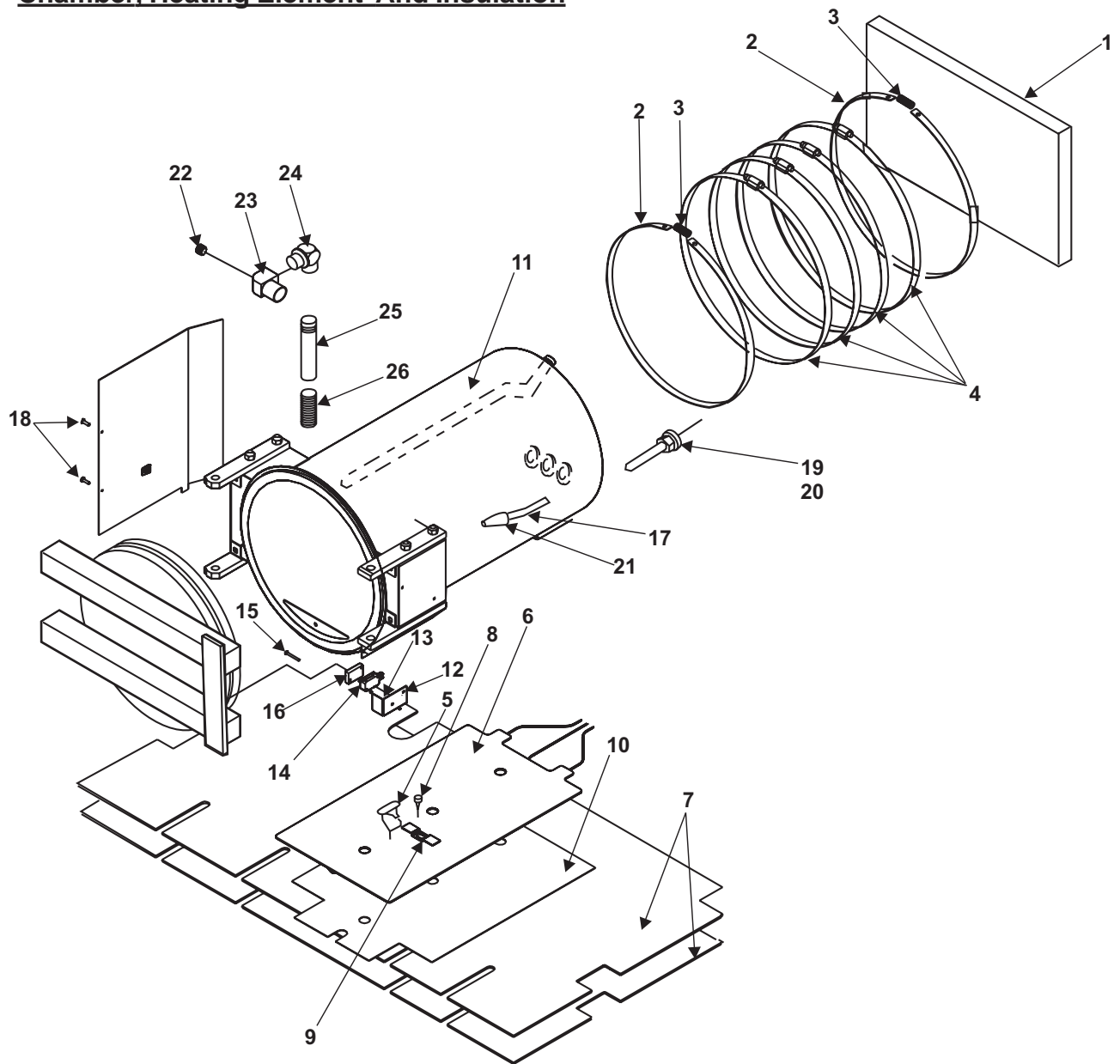
In case of a power failure during the sterilization cycle, pressure in the chamber is automatically vented to the atmosphere and display is blank.

## Chamber and Door



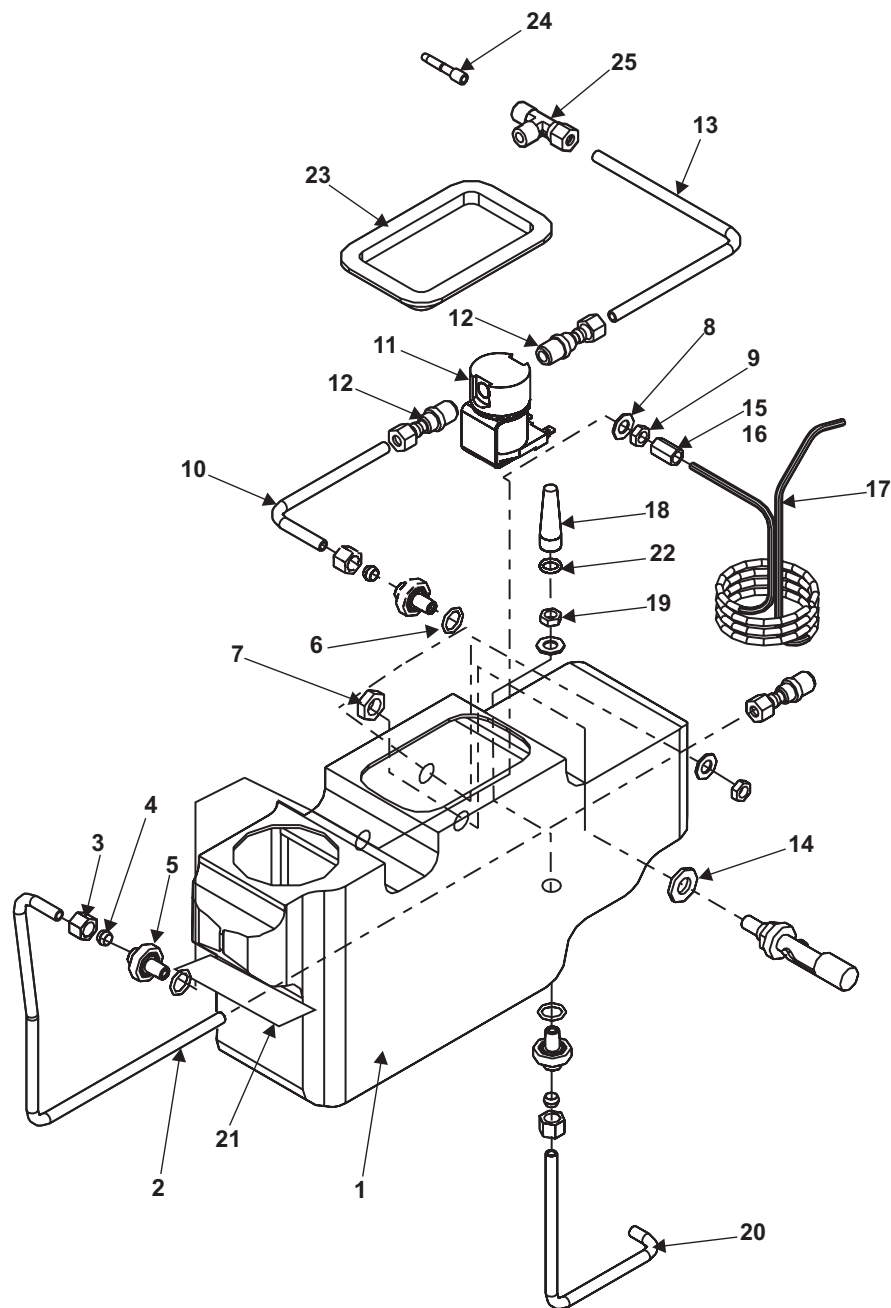
No.	Part No.	Description
1	15 39 845	Screw- Button Hd. 1/4 20 x .375"
2	41 97 245	Stud- Handle
3	01 97 54	Washer- Shim 1.0 oDX 15/32 IDX.016
4	15 39 258	Spacer- latch slide
5	41 96 809	Hinge Pin
6	15 39 589	E-Clip 3/8"
7	41 97 112	Door & Chamber Assy. (8"- Model AE)
	41 97 179	Door & Chamber Assy. (10"- Model AF)
8	30 00 077	Nut- Retainer
9	42 05 790	Bracket- Lever switch (8"- Model AE)
	42 05 808	Bracket- Lever switch (10"- Model AF)
10	33 22 281	Spacer- Door
11	15 39 241	Seal (8"- Model AE)
	15 39 407	Seal (10"- Model AF)
12	42 03 845	Gasket Retain Stud Assy. (8"- Model AE)
	42 03 985	Gasket Retain Stud Assy.(10"- Model AF)
13	15 39 928	Nut- Hex 41H 2520
14	15 39 894	Lock Washer- .26IDX.43ODX.05 STL
15	15 39 514	Insulation- Door (8"- Model AE)
	15 39 720	Insulation- Door (10"- Model AF)
16	54 69 635	Locking Pin- 8x10
17	51 74 870	Slide- Bar (8"- Model AE)
	51 74 888	Slide- Bar (10"- Model AF)

## Chamber, Heating Element And Insulation



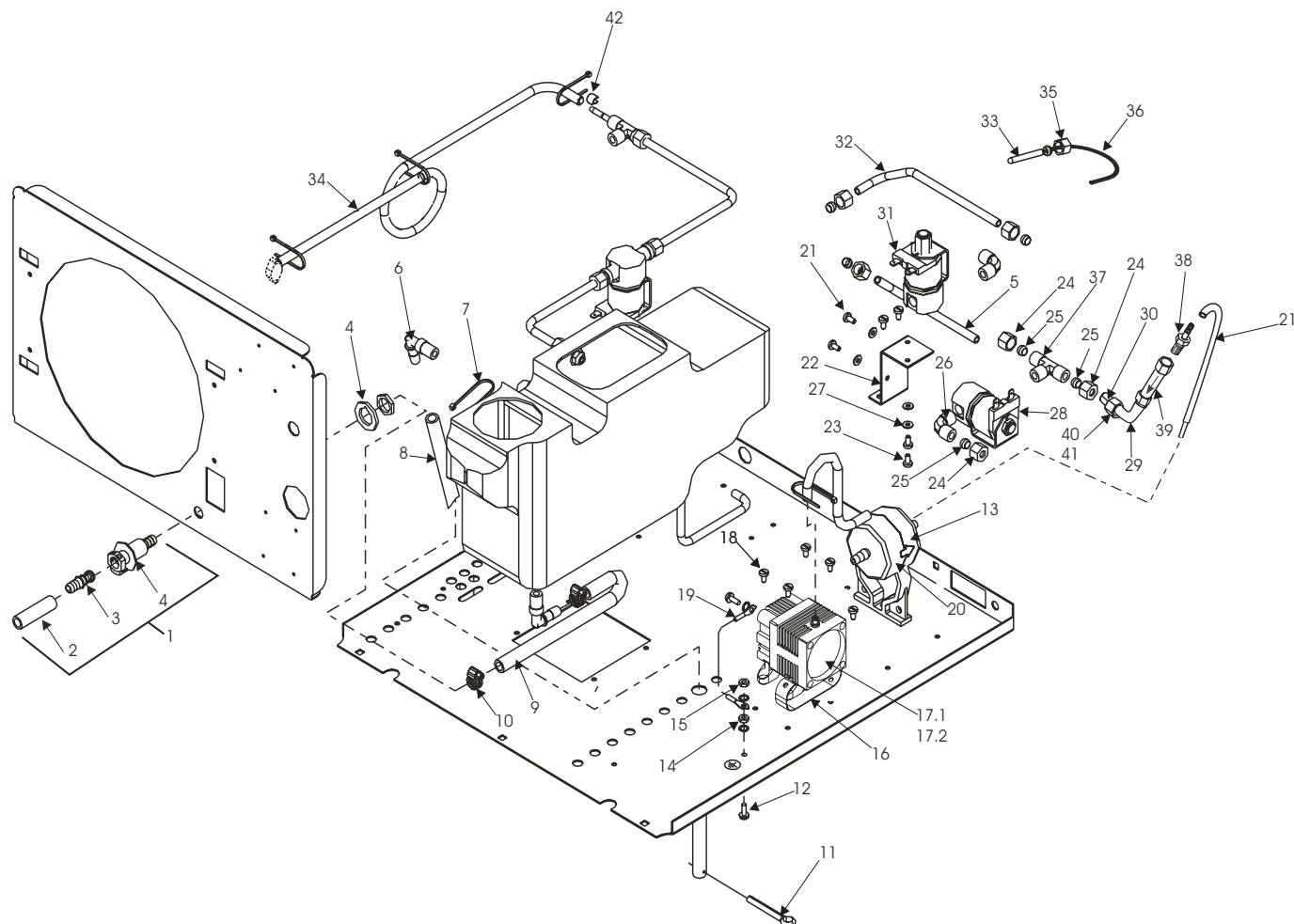
No.	Part No.	Description	No.	Part No.	Description
1	15 39 670	Insulation- Rear	15	15 39 969	Phillips Hd. Screw- 4-40 x 1"
2	30 05 035	Strap- Insulation	16	15 39 712	Spacer- Door Switch
3	15 39 472	Spring	17	18 81 023	Tube- Chamber
4	15 39 647	Band- Pressure Plate	18	30 00 036	Round Head Screw- 8-32 x .375
5	15 21 512	Overheat Protector- Chamber	19	41 96 767	Compression Sleeve- Pressure Plate
6	41 91 826	Heater (8"-Model AE)	20	41 96 759	Compression Nut- 1/4"
	019769	Heater (10"-Model AF)	21	18 81 031	Filter- Fill Line
7	54 27 906	Insulation- Chamber	22	42 07 432	1/4" Brass Plug (Siemens 115, 230V & TUV 230V)
8	33 25 094	Surface Sensor	23.1	42 07 424	Elbow- 1/2 St 1/4 Tap (Siemens 115, 230V & TUV 230V)
9	15 31 628	Sensor Bracket	23.2	15 39 324	Elbow- 1/2 St (Delta-XL 115V)
10	15 21 158	Plate- Pressure	24	42 05 055	Value- Safety Relief/Chain
11	42 00 346	Tube- Chamber Top	25	15 36 486	Nipple- 1/2 NTPx4
12	15 39 803	Nut- Hex 41H-440	26	15 29 267	Tube- Relief
13	42 05 816	Cover- Level Switch			
14	42 05 782	Switch Lever			

## Reservoir Parts



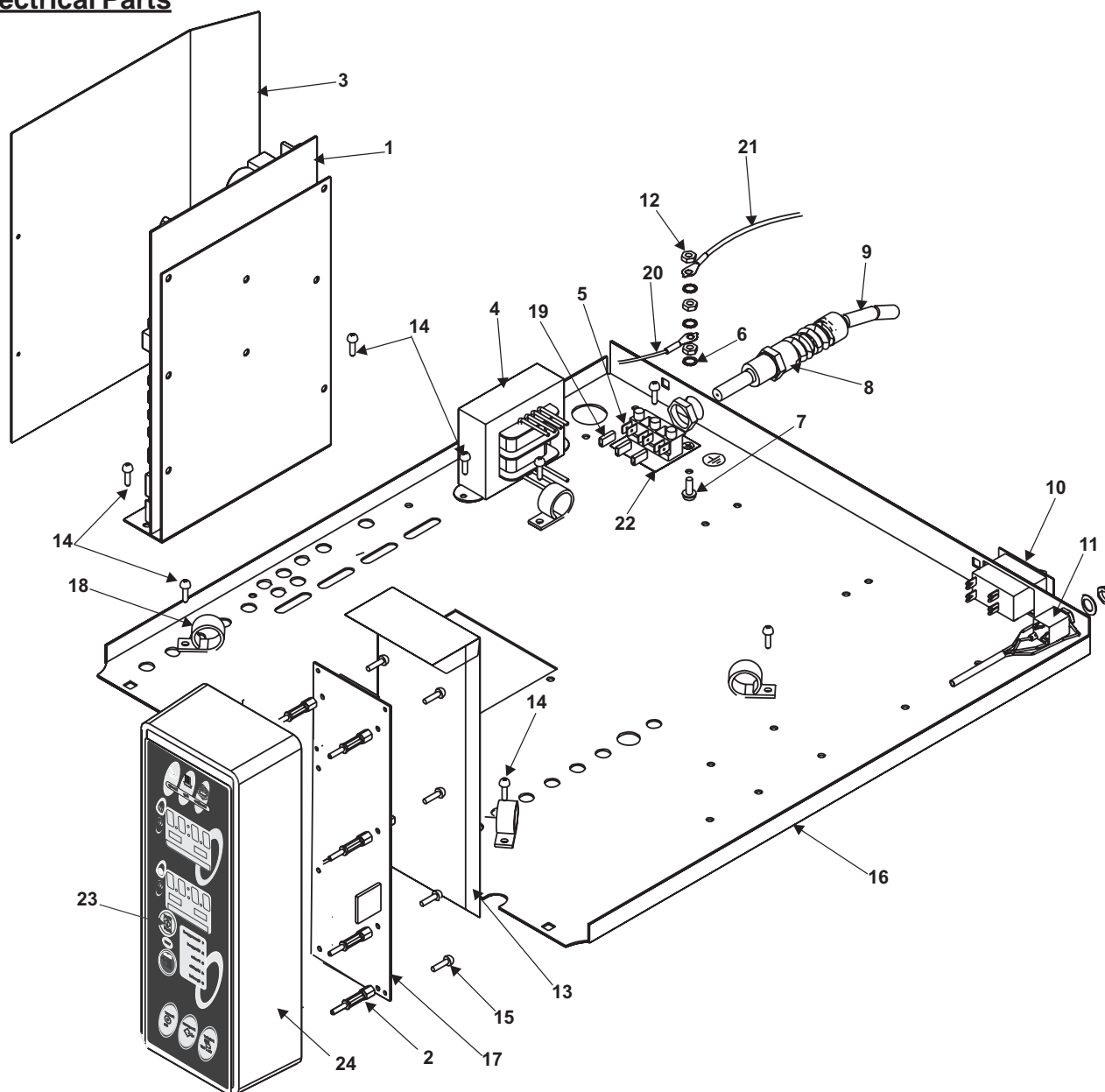
No.	Part No.	Description	No.	Part No.	Description
1	33 39 913	Reservoir	13	41 97 047	Tube - Chamber/Dump (8"-Model AE)
2	41 96 924	Tube - Bel to Res (8"-Model AE)		41 97 039	Tube - Chamber/Dump (10"-Model AF)
	41 96 999	Tube - Bel to Res (10"-Model AF)	14	15 39 563	Washer - Rubber
3	18 81 056	Nut - Compression (5/16")	15	18 81 080	Nut - Condenser Tube
4	18 81 064	Sleeve - Compression, Tapered	16	18 81 098	Sleeve - Compression
5	15 39 449	Coupling - Vent Condenser	17	18 81 106	Condenser - 4 Coil
6	18 81 072	O-ring	18	94 32 311	Filter - Reservoir
7	33 25 052	Water Level Assembly	19	15 26 412	Nut - Air Valve
8	30 00 002	Washer - Flat	20	41 96 932	Tube - Reservoir to Fill (8"-Model AE)
9	15 39 613	Nut - Air Valve		41 96 965	Tube - Reservoir to Fill (10"-Model AF)
10	42 05 899	Tube- Dump to Res (8"-Model AE)	21	15 35 587	Gasket - Support
	41 97 021	Tube- Dump to Res (10"-Model AF)	22	94 35 546	O-ring
11	94 42 930	Dump Solenoid	23	15 39 746	Cap Reservoir
12	94 42 724	Connector	24	41 96 841	Reducer
			25	94 42 732	Tee-- Compression 5/16

## Plumbing Parts



No.	Part No.	Description	No.	Part No.	Description
1	41 93 376	Drain Hose Assy. (Incl. 2,3,4)	22	41 96 817	Bracket Valve
2	33 39 947	Tube Drain	23	30 00 044	Screw
3	15 22 502	Quick Connect Male	24	18 81 056	Nut
4	15 22 494	Quick Connect Female	25	18 81 064	Sleeve
5	41 96 973	Tube Fill to Ch	26	94 42 740	Elbow
6	15 39 381	Elbow-White Polypropylene	27	15 39 837	Washer
7	15 39 274	Wire Tie	28	94 42 922	Fill Solenoid
8	94 42 906	Hose Overflow	29	54 40 610	Elbow-90° 5/16 x 1/8 Npt
9	15 22 510	Hose Drain	30	54 40 602	Tube-1" Long x 5/16 O.D. x .049w Brs
10	15 39 365	Clamp - Hose	31	94 42 948	Bellows Solenoid
11	94 42 815	Pin Cotter	32	41 96 981	Tube Bel to Ch
12	15 39 829	Ground Screw- 10-24 x .5	33	041572	RTD Sensor
13	41 97 146	Air Filter	34	94 48 598	Tubing Connector - Long
14	30 00 051	Lock Washer	35	41 96 759	Nut 1/4 Comp.
15	30 00 028	Hex Nut	36	41 96 767	Sleeve 1/4 Comp.
16	42 07 416	Pump Strap	37	94 42 732	Tee-Compression 5/16"
17.1	33 25 086	Pump (Delta & Siemens 115V)	38	54 40 628	Barb-3/16 x 1/8 Npt
17.2	33 38 683	Pump (Siemens & TUV 230V)	39	54 73 017	Check Valve
18	42 05 923	Screw Button Head	40	18 81 056	Compression Nut 5/16"
19	42 05 915	GND Wire Pump	41	18 81 064	Compression Sleeve 5/16"
20	41 97 138	Holder-Filter	42	044176	Clamp
21	94 48 598	Tubing Connector-Short			

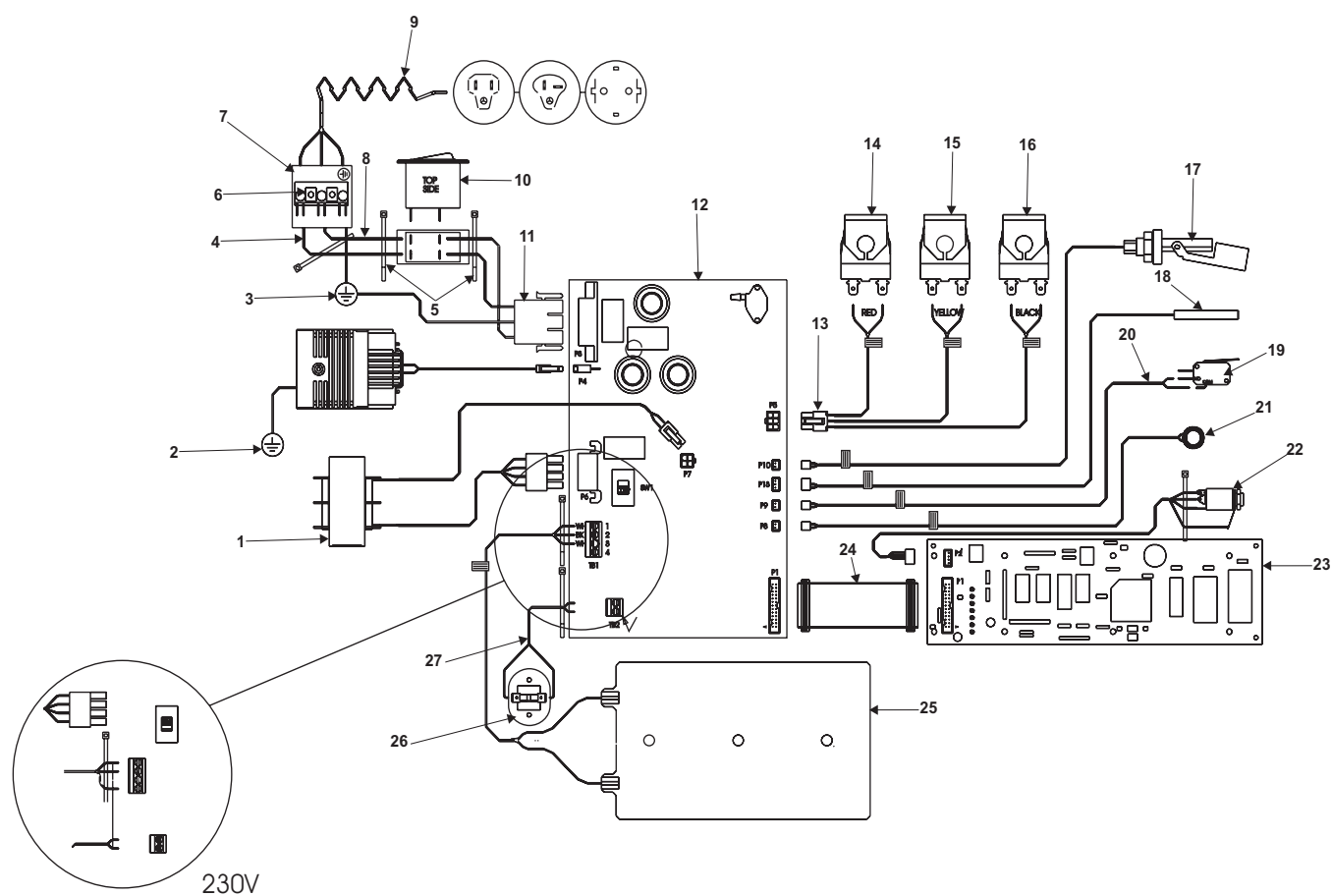
## Electrical Parts



No.	Part No.	Description	No.	Part No.	Description
1	044201	Power Supply PCB Assy	13	045835	Control PCB Guard
2	94 42 765	Extension- Spacer Circuit Board	14	42 05 923	Screw- Button Head
3	41 97 005	Power PCB Guard	15	15 25 331	Screw Pan Hd - 32 x 5/16"
4	15 28 368	Transformer	16	045841	Panel- Bottom (8"- Model AE)
5	70 38 623	Terminal Block		045455	Panel- Bottom (10"- Model AF)
6	30 00 051	Lock Washer	17	42 05 881	MPU Control Assy. (8"- Model AE)
7	15 39 829	Ground Screw- 10-24 x .5		041136	MPU Control Assy. (10"- Model AF)
8	77 40 640	Strain Relief	18	18 98 639	Clip- Wire Harness
9	15 30 661	Power Cord (115V)	19	94 33 756	Heat Shrink Tubing
	041277	Power Cord ( 230V)	20	33 25 029	Cable- AC Power to Pwr PCB
10	46 99 190	Circuit Breaker - 10A (230V)	21	42 07 390	Ground Wire- Terminal To Chasis
	46 92 208	Circuit Breaker - 20A (115V)	22	29 44 098	Label- Terminal Block
11	33 25 110	Cable- Printer Socket	23	040788	Front Panel PCB Assy.
12	30 00 028	Nut- Hex 41 H-1024	24	045487	Electrical Cover

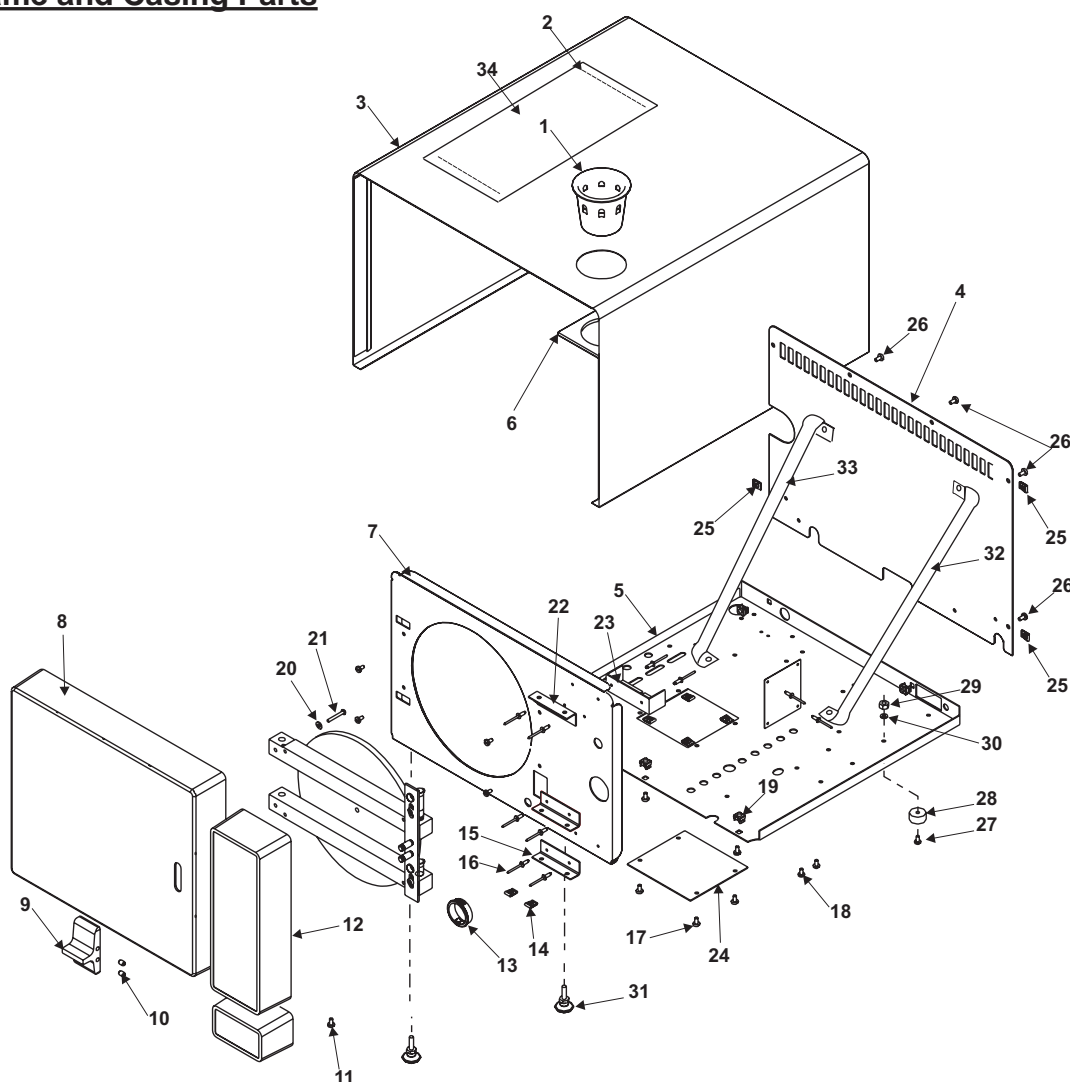


## Electrical Diagram



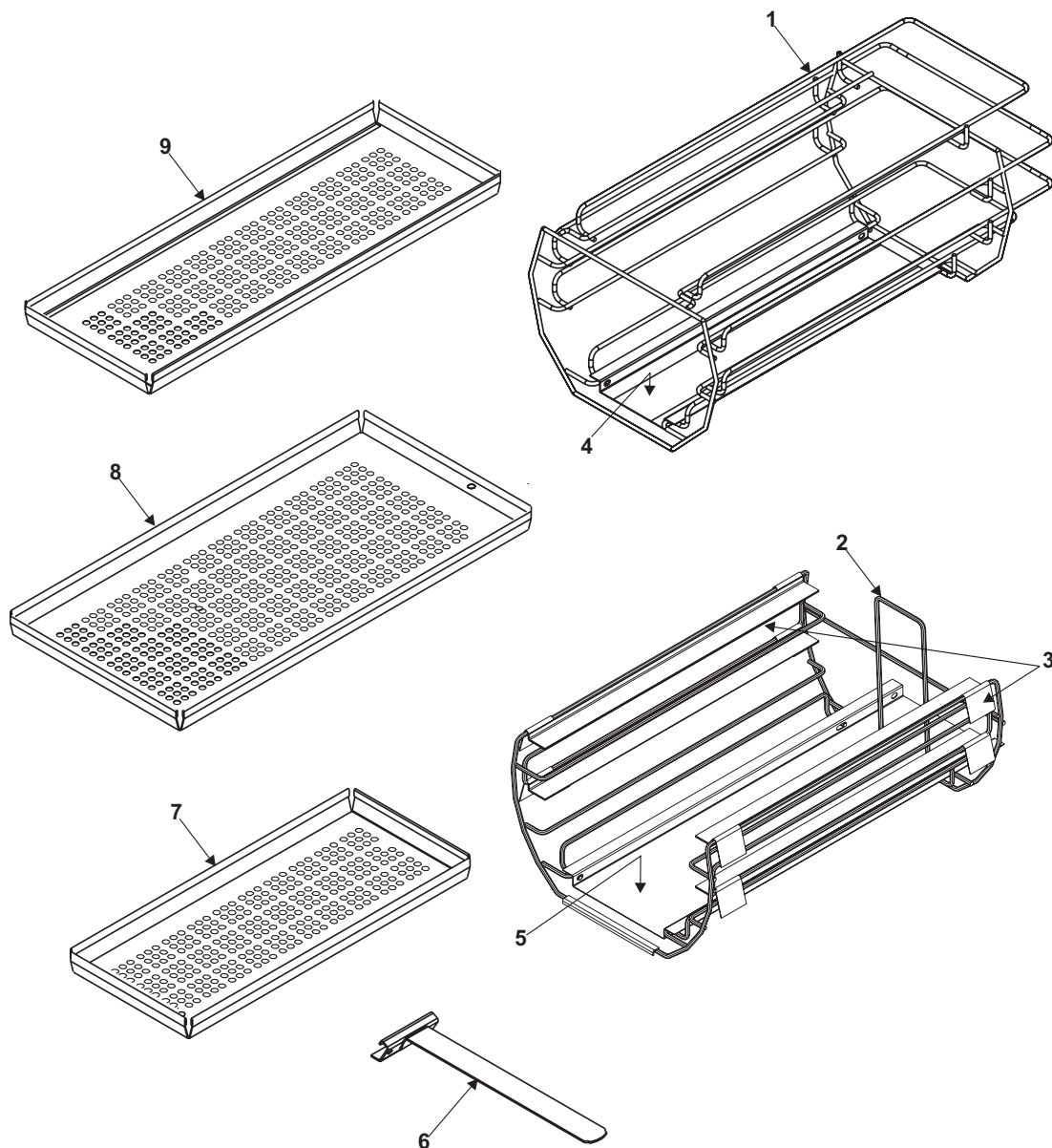
No.	Part No.	Description	No.	Part No.	Description
1	15 28 368	Transformer 120/240V, 40VCT	14	94 42 930	Dump Solenoid
2	40 05 915	GND Wire to Pump TO Chasis	15	94 42 948	Bellow Solenoid
3	42 07 390	GND Wire Term to Chasis	16	94 42 922	Fill Solenoid
4	42 07 374	Wire Blu (Trm Bck/Crct Brk)	17	33 25 052	Level Switch
5	15 39 274	Wire Tie High Temp.	18	041572	RTD Sensor
6	70 38 623	Terminal Block	19	42 05 782	Switch Lever
7	29 44 098	Label Terminal Block	20	33 25 078	Cable Door Switch
8	42 07 382	Wire Brn (Trm Bck/Crct Brk)	21	33 25 094	Surface Sensor
9	15 30 661	Power Cord 115V)	22	33 25 110	Cable Printer Socket
	041277	Power Cord ( 230V)	23	42 05 881	MPU Control Assy. (8"- Model AE)
10	46 99 208	Circuit Breaker - 20 AMP (230V)		041136	MPU Control Assy. (10"- Model AF)
	46 99 190	Circuit Breaker - 10 AMP (115V)	24	15 37 492	Cable Assy- Power PCB to MPU
11	15 37 476	Cable AC Power to Power PCB	25	41 91 818	Heater (8"- Model AE)
12	15 22 775	Power Supply PCB Assy		019769	Heater (10"- Model AF)
13	33 25 060	Cable Solenoid	26	15 21 512	Chamber Overheat Protector
			27	33 25 037	Wire Assy Over Heat Protector

## Front Frame and Casing Parts



No.	Part No.	Description	No.	Part No.	Description
1	18 81 114	Cup Reservoir Fill	16	15 36 445	Rivet - Pop 8 CSNK 1/2 x .101/.130
2	51 49 815	Dou. Side Tape	17	30 00 036	Phil. Hd. Screw- 8-32 x .375 ZN
3	045840DW	Case (8"- Model AE)	18	15 39 902	Screw- 85SS-1024-37
	045457DW	Case (10"- Model AF)	19	30 00 077	Nut- Retainer
4	045843DW	Panel- Rear (8"- Model AE)	20	15 39 852	Lock Washer
	045456DW	Panel- Rear (10"- Model AF)	21	30 00 069	Screw- Mach. Rd. Hd. 8-32 x 1.25
5	045841	Bottom Panel (8"- Model AE)	22	15 39 183	Bracket- Top Electronic Cover
	045455	Bottom Panel (10"- Model AF)	23	42 00 338	Reservoir Support
6	42 05 048	Casing Gasket Set	24	045459	Cover- Bottom
7	045842	Front Panel (8"- Model AE)	25	15 39 530	Clip- Speed
	045454	Front Panel (10"- Model AF)	26	15 39 936	Mach. Slotted Screw- 10-24 x .375
8	51 63 550DW	Door Cover (8"- Model AE)	27	15 39 910	Mach. Slotted Scw- #10
	51 63 535DW	Door Cover (10"- Model AF)	28	15 39 308	Foot
9	045488	Handle- Granite	29	30 00 028	Nut- Hex
10	30 00 010	Screw- Soc. Hd. 6-32 x .375	30	15 39 811	Washer- 8 O.D. 2143 046
11	15 39 985	Cap- 8-32 x .375	31	4206459	Glide- Adjustable Swivel
12	045487	Cover- Elect Assy.	32	045844	Brace- Right (8"- Model AE)
13	15 39 423	Bushing- 1 5/16 ID		045464	Brace- Right (10"- Model AF)
14	15 39 316	Nut- Speed	33	045845	Brace- Left (8"- Model AE)
15	15 39 571	Bracket- Bottom Electronic Cover		045465	Brace- Left (10"- Model AF)
			34	042912	Operation Quick Reference Card

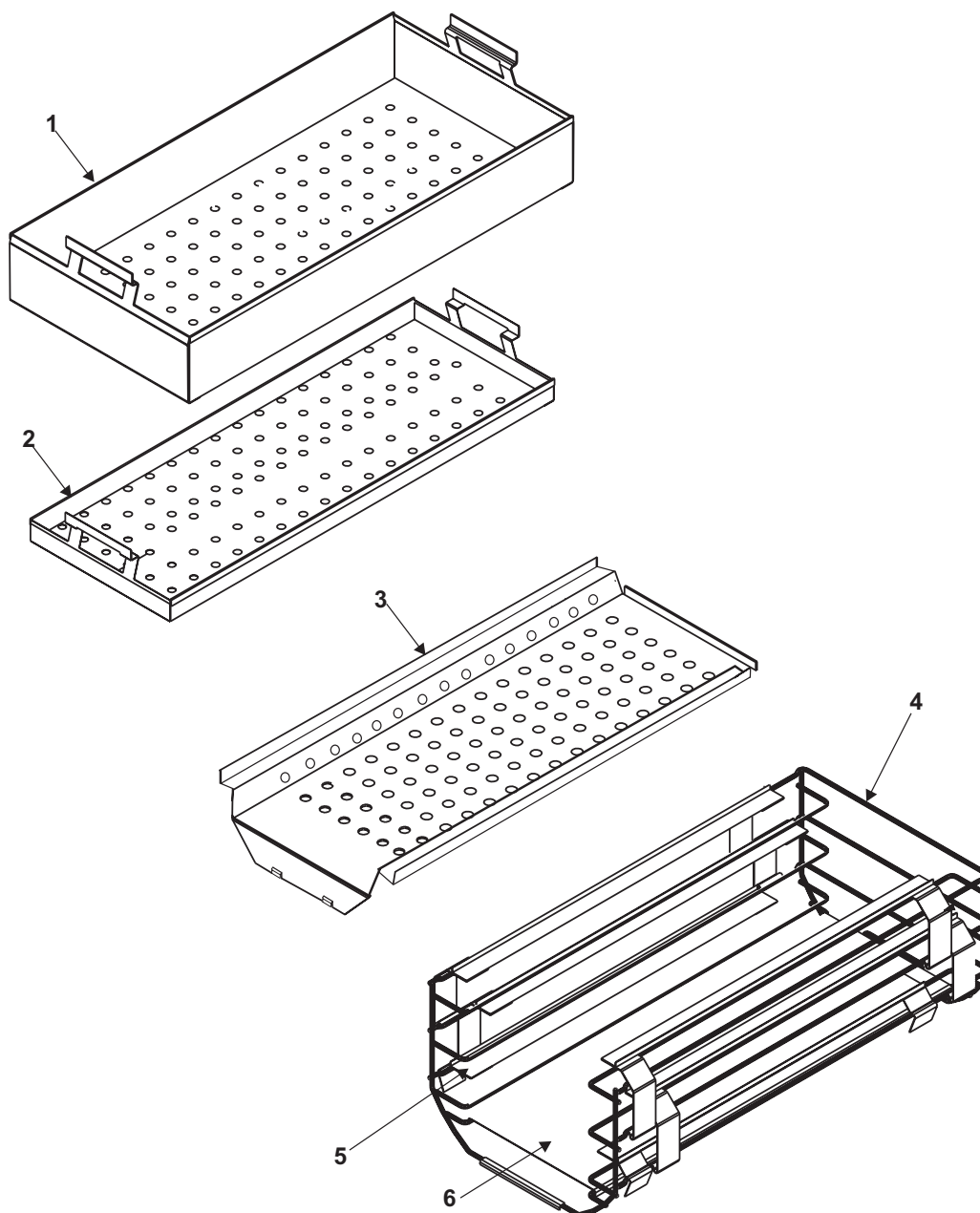
## Tray and Tray Rest (8" - Model AE)



No.	Part No.	Description
1	30 00 143	Tray Rest (Delta 115V & TUV 230V)
2	15 39 290	Tray Rest (230V)
3	15 33 848	Clip-Tray Support
4	30 00 150	Baffle- Chamber (Delta 115V & TUV 230V)
5	15 39 548	Baffle- Export (230V)
6	15 39 696	Tray Handling Accessory
7	15 39 779	Tray- Export
8	15 39 761	Tray- Large Auto
9	30 00 135	Tray- Small Auto

---

## Tray and Tray Rest (10" - Model AF)



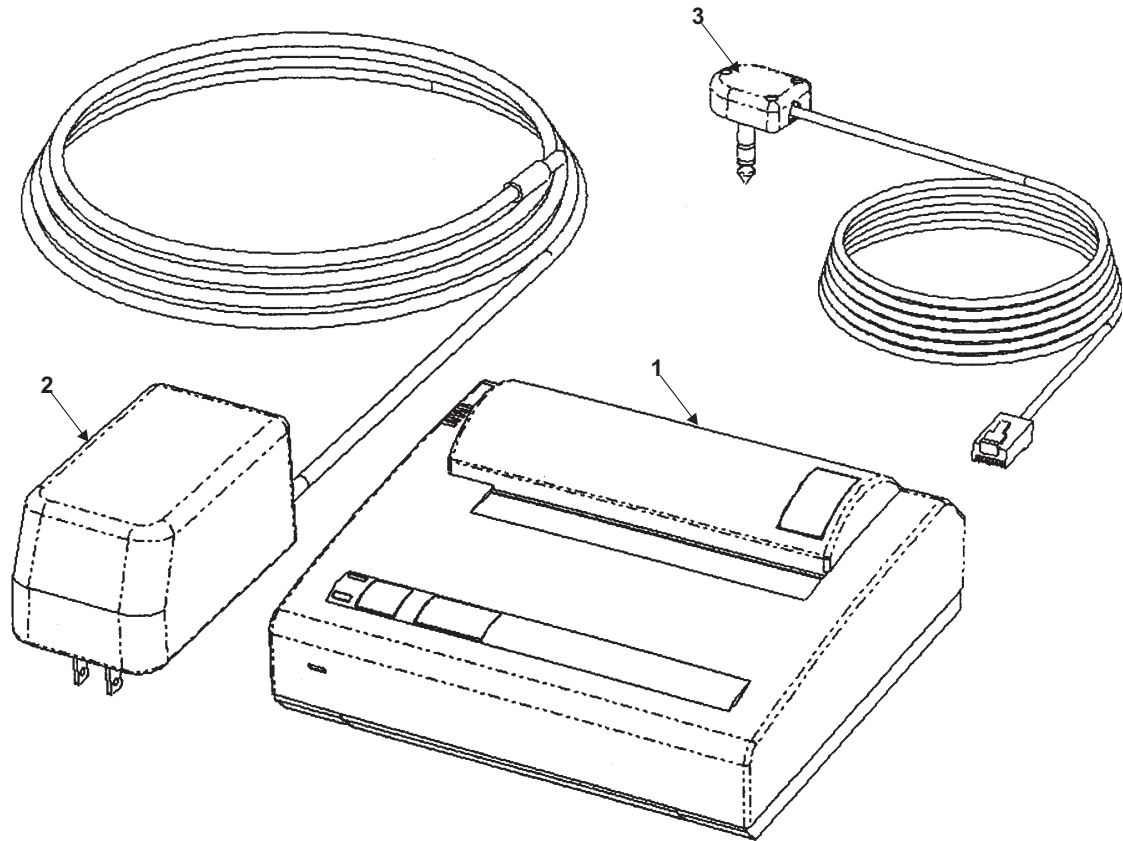
No.	Part No.	Description
1	15 39 340	Large Instrument Tray
2	15 39 357	Small Instrument Tray
3	044159	Trayrest
4	30 00 184	Trayrest - Export
5	15 37 666	Clip- Tray Support
6	30 00 192	Splash Guard- Export

---

## Time/Temperature Printer

Printer Kit- 54 37 590 (120V)

Printer Kit- 54 37 624 (240V)



No.	Part No.	Description
1	54 37 525	Printer
2	54 39 166	Power Adapter - 115V
	54 75 533	Power Adapter - 230V
3	54 30 595	Cable - Printer Jack

## Important Notes

- **Measurements**

Instruments required

1. Digital multimeter model FLUKE 8000 A, or equivalent.

Accuracy: AC voltage  $\pm$  0.5% of reading plus 1 digit.

DC voltage  $\pm$  0.1% of reading plus 2 digits.

DC current  $\pm$  0.3% of reading plus 1 digit.

2. Testleads: Small needle point testleads are required when voltage measurements are performed at connectors which remain plugged.

Always switch the unit OFF before connecting measuring instruments.

Select the correct type of current/voltage and set the measuring range according to the expected measured values.

Carry out continuity tests only with the unit switched OFF.

- **Warm-up period & self-test**

Do not press any buttons when switching ON!

After switching ON, the unit runs a self-test for the unit electronics.

- **Interference with electromedical devices by radio telephones**

To guarantee the operational safety of electromedical devices, the operation of mobile radio telephones in the medical practice or hospital area is prohibited.

- **Troubleshooting tree guidelines**

Element, component identifier: Located at the top of each page.

Unplug X4 **See Figure 22.** At lead, check continuity X4.A4 / X4.B4. Is continuity present?

No

Yes

Refers to designated pictorial on preceding page.

- **When using the troubleshooting trees**

and a connector is unplugged for continuity or voltage measurements, the term:

“at lead” indicates that the measurement is to be performed on the cable or “lead” end.

“at board” indicates that the measurement is to be performed on the PCB connector.

- **Resetting the unit**

Turn the power off at the main Power Switch.

Turn unit back on after 10 seconds..

- **Replacing parts**

Switch the unit OFF and unplug before replacing parts.



To protect electrostatic-sensitive devices (ESD) on PC-boards, observe the ESD guidelines. Avoid coming into contact with electronics components. As well as possible, handle PC boards only at the edge. Discharge yourself by touching a grounding point.  
Transport PC boards only in the original transport bags!

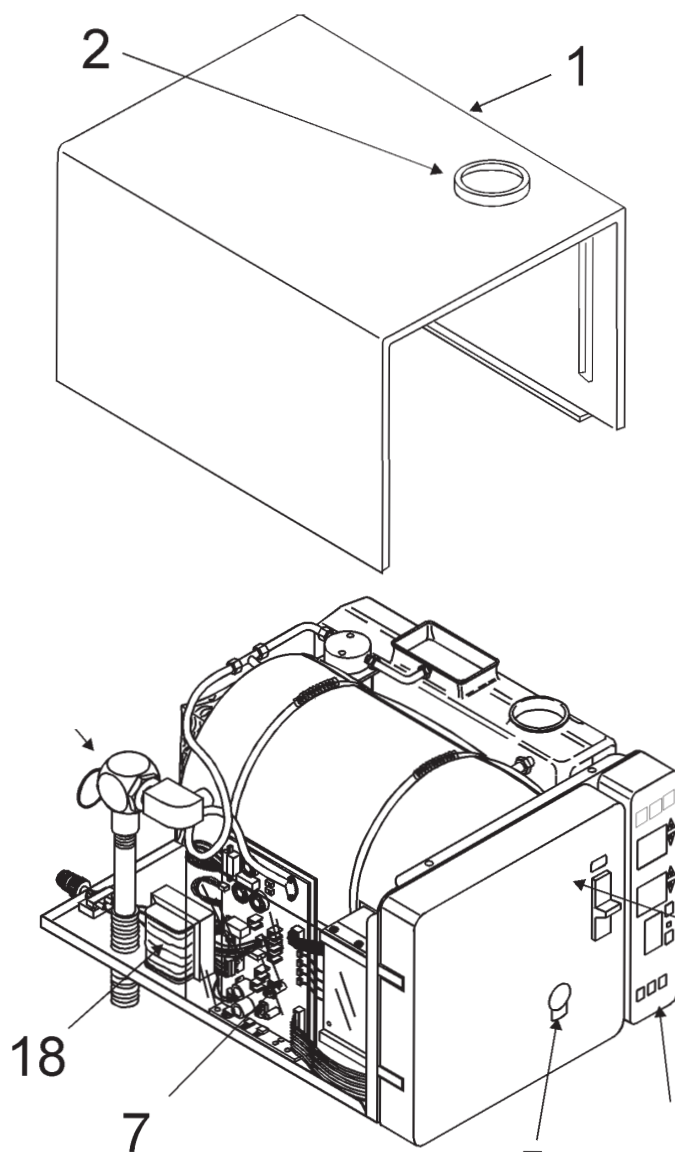
Find article numbers required for ordering replacement parts in the List of Spare Parts documents, order number P/L 4702135 for the 8" unit or P/L 4702143 for the 10" unit. The pictorial representations in the spare parts list offer valuable assistance for replacement of parts.

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## Removing/Reinstalling Cover

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1. To remove cover, remove only the two bottom screws of rear panel.
2. Remove reservoir fill cup.
3. Slide cover to rear, then lift front of cover slightly to clear top of reservoir.



**Note:** When replacing cover, make sure lip of front panel engages in slot along all edges.  
Reinstall screws and reservoir fill cup.

---

The Sterilizer is a fully automatic autoclave, which allows an operator to select one of the four preset functions (Wrapped, Unwrapped, Packs and Liquids) and one user-programmable function (Special) for sterilization or disinfection. The microprocessor automatically selects the cycle time, temperature and pressure for the preset programs. See User Manual.

When the operator depresses the “CLEAR/START” button, the unit will display the selected mode’s parameters for four seconds and then fill the chamber with distilled water from the reservoir. When the filling period is complete, automatic activation of the heating elements builds temperature and pressure for the desired cycle.

As the temperature in the unit rises above 90°C., the microprocessor monitors the unit for saturated steam conditions and starts the air bleeding process via an electronic bellows function. If this process cannot be completed in seven minutes, then the unit automatically aborts the cycle and displays a flashing “FAIL” on the display to indicate possible blocked or defective bellows. See “FAIL” in the Troubleshooting section. The cycle is aborted at this point to avoid a possible overpressure condition.

At the point that saturated steam conditions are met, the unit will continuously build temperature and pressure to the minimum values of the mode selected. These values are:  
134°C and 216 KPa for Wrapped and Unwrapped,  
121°C and 115 KPa for Packs and Liquids.

For the Special mode, the values can be set to the operator’s preference. See User Manual.

Once sterilization parameters are achieved, if the pressure drops more than 4 KPa below the selected pressure, or if the temperature drops more than 1°C below the selected temperature, the countdown timer will stop until these parameters are again met. If the timer does not resume countdown within three minutes, the unit will automatically abort the cycle and display “FAIL” continuously. See “FAIL” in the Troubleshooting section.

After the cycle is complete and the chamber is vented, the drying cycle begins. Filtered ambient air is pumped through the chamber for a preset time. The time is set at the factory for 30 minutes, but can be changed from 0-99 minutes. See User Manual.



---

## Error Code Explanations

---

1. **H20**- Insufficient water in sterilizing chamber.
2. **Fail**-
  - a) Unit takes more than 45 minutes to reach operating temperature;
  - b) Door opened after "FILL", display extinguishes;
  - c) Unit takes more than 7 minutes between 101° C. and 110° C.;
  - d) More than a 3 minute lapse in sterilize countdown due to leak causing more than 4 KPa pressure or if pressure decrease.
3. **Door**- Door not fully closed during fill cycle.
4. **P1**- Pressure sensor out of calibration or not working.
5. **P2**- Unit reaches 241 KPa before displaying 135° C.
6. **SS-1**- Steam sensor is defective or autoclave is too cold (Under 10° C.).
7. **SS-2**- Surface sensor circuit open during self test.
8. **SS-3**- Steam sensor too hot (Over 140° C.).
9. **LB**- Low battery condition in front control panel.
10. **U1**- Transformer problem.
11. **S1**- Fill/ Vent solenoid coil or circuit open.
12. **S2**- Dump solenoid coil or circuit open.
13. **S3**- Bellows solenoid coil or circuit open.

---

## Component Description by Function

---

- **Door Lock**

The door locking mechanism prevents opening of the door while the unit is pressurized.

- **Safety Valve**

The safety valve serves as backup protection in case of over pressure in the chamber. The safety valve opens if chamber pressure exceeds 2.6 bar

NOTE:

When replacing the safety valve, use only the type for which the unit was originally certified.

- **Fill/Vent Solenoid**

The fill / vent solenoid serves two purposes under software control:

- When in the fill process this, solenoid allows water to enter the chamber from the reservoir. It is open for a minimum of one minute during this process. It will be open for longer periods of time as each successive cycle is run based on the amount of water in the reservoir. If there is pressure in the unit at the time the fill cycle starts, then this timer will be delayed until all pressure has been exhausted in order to facilitate rapid cycling of the unit.

- When in the venting process, and the pressure is between 0.40 and 0.20 bar, this solenoid is used to extract the Water from the chamber.

- **Bellows Solenoid**

This solenoid is under software control and also serves two purposes:

- When in the venting process, this solenoid is used to exhaust the pressure from the working value down to 0.40 bar.

- When in the air-bleeding process, this solenoid is used as an electronic bellows to remove the air from the chamber in order to obtain saturated steam conditions.

- **Dump Solenoid**

This solenoid is under software control. Its primary purpose is to rapidly exhaust residual chamber pressure. Normally, during the venting process, it will be opened at 0.20 bar, but it may be opened during the filling process to exhaust residual pressures.

- **Reservoir Assembly**

The reservoir assembly holds water (approx. 4 liters) for filling the autoclave chamber. Drain tube in the reservoir allows the operator to drain from the front of the sterilizer (see User Manual, "Maintenance").

The condensing coil in the reservoir condenses steam, coming from the chamber, back into water for reuse in the next cycle.

- **Water Level Indicator**

A float mechanism activates the low water light on the front panel when water level in reservoir drops (see User Manual, chapter "Operations").

- **Heating Element**

The heating element allows for even heating of the chamber. The power level is controlled by the microprocessor for preheat, sterilization and drying cycles. When the unit is turned on, the heaters are energized in preheat mode (0600-1800 hrs) to minimize the warm-up time for the first cycle. The heaters modulate **ON/OFF** at a given duty cycle and depend upon the incoming line voltage and frequency in every process.

- **Air Pump and Filter**

A positive displacement air pump forces ambient air through a 0.3  $\mu\text{m}$  filter and then through the chamber for the programmed time.

- **Microprocessor MPU / Front Panel Printed Circuit Board**

There are two PC boards located underneath the front cover, which contain the microprocessor and the display driver/ push button controller. These two PCBs are stacked one on top of the other.

The **top PCB** is the microprocessor board, which has LEDs and test points for monitoring the input-output status of the processor.

The **bottom PCB** is the display driver/ Push-button controller.

**WARNING:** If the Display (bottom) PCB is defective, return it with the display and cover intact. Do NOT attempt to remove it from the cover !

- **Power Board**

This PCB carries all of the necessary driver circuitry for the solenoids and the heater and the interfaces for all temperature sensors and the pressure sensor. This PCB has indicators and test pins for monitoring the input/output status of this board.

- **Transformer**

This Transformer generates all of the low voltage supplies required to operate the unit.

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## Audible Signals

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The Sterilizer provides some of its status information through audible signals:

A single beep sounds each time a button or the main power switch is activated.

Five continuous beeps indicate the beginning of the drying cycle. Five more beeps indicate the completion of the drying cycle.

Continuous beeps for one minute indicate an operational error. Beeper can be silenced during an operational error by depressing the "CLEAR/START" button. Be sure to record the display status before depressing the button as the display may also be cleared at this time. (The "DOOR" alarm is cleared if the door is closed).

- 
- After loading the Sterilizer, close the door, select the proper Mode and depress “CLEAR/START”. The unit will display selected modes parameters for four seconds, after which it will display “FILL” as water runs in from the water reservoir into the chamber.

After filling, the display will show the current pressure (“PRES”) and temperature (“TEMP”). The heater will begin cycling on and off to start chamber heat-up and pressure build-up. Pressure should start to build at about 90°C.

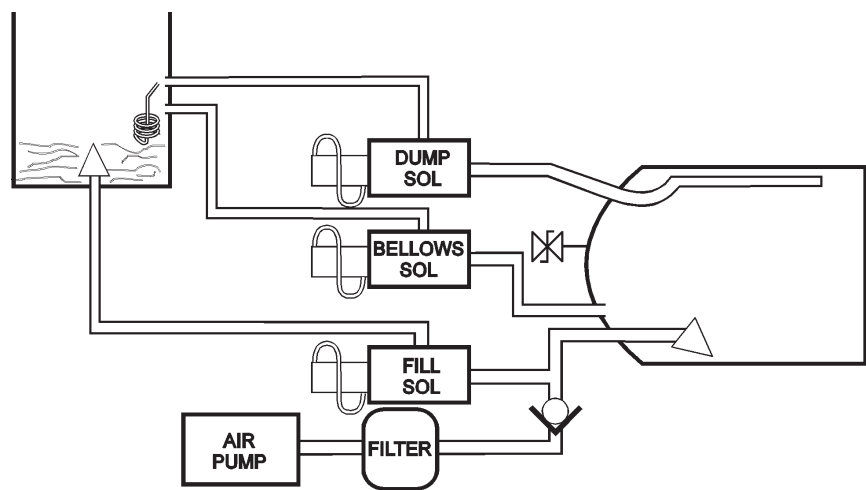
Once the sterilization cycle begins, it is controlled by the pressure. The sterilization timer will be shown in the lower window, (unless the operator has programmed the unit to show temperature during the sterilization instead of time) and will count down when the select temperature and pressure parameters are above their minimum values.

If pressure loss occurs, the timer will pause, since it only counts down when the select temperature and pressure parameters are above their minimum values. A “FAIL” alarm will occur if the cycle pauses for more than a total of three minutes because of pressure loss.

- At the end of the sterilization time, the bellows solenoid opens to lower chamber pressure to 40 KPa. When the pressure reaches 40 KPa the bellows solenoid will close and the fill/vent solenoid will open and the remaining water will be extracted from the chamber. This process continues until the pressure reaches 20 KPa, at which time the fill/vent solenoid will close and the bellows solenoid will reopen along with the dump solenoid, to rapidly vent the remaining pressure. (The “Liquids Cycle” is an exception: This cycle cools down without venting to prevent the liquids from boiling over from a sudden pressure drop).
- At this point, the drying cycle begins. A nominal 30 minute drying cycle is preprogrammed. The drying time can be changed from 0-99 minutes. See User Manual.  
To start another load, depress “CLEAR/START” to initiate the sterilization process again.

See also User Manual.

**Table: Valve Actuation Operation Mode**



**Cycle Process**

<b>Solenoid</b>	Fill	Sterilize	Vent >40 KPa	Vent (40-20 KPa)	Dump (20 KPa)	Off
Fill/Vent Solenoid	Open	Closed	Closed	Open	Closed	Closed
Bellows Solenoid	Open	Closed	Open	Closed	Open	Open
Dump Solenoid	Open	Closed	Closed	Closed	Open	Closed

---

## Self-Diagnostics Check

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To run self check, simply turn on main power switch at back of unit and wait for the unit to beep and finish a series of clicks. At this time, depress and hold the "CLEAR/START", then depress the "POWER", letting go of both at the same time.

This operation does not check "Lb" for low battery.

The printer may be used as a diagnostic tool. Cycles recorded in the Sterilizer's memory may be downloaded to the printer starting with the last cycle first. Press and hold the "PRINTER" button to download the memory. To stop the download process, depress "CLEAR/START". Eight lines are printed out per run cycle.

**Note: Unit will turn off after the download process is complete.**

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## Specific Usage Problems

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Mineral buildup on chamber wall or water spots on chamber and contents.

- Problem Cause  
Minerals in water deposit on chamber or on contents.
- Corrective Action  
Clean per User Manual. Refill using distilled demineralized water.

**Unit takes an excessive amount of time (over 21 min. from warm start) to reach sterilization temperature.**

- Problem Cause
  1. Load is too large.
  2. Low power line voltage.
  3. Leak in valves.
- Corrective Action
  1. Remove some packages/articles for faster heating.
  2. Correct voltage if possible.
  3. Refer to "FAIL" in Troubleshooting.

Water flows into bottom of Sterilizer when unit is not in "FILL" cycle.

- Problem Cause
  1. Leaking fill solenoid valve.
  2. Hole in condensing tube.
- Corrective Action
  1. Clean or replace fill solenoid valve.
  2. Replace condensing tube.

Unit drips on counter when door is opened after cycle.

- Problem Cause  
Rubber spacer missing or damaged.
- Corrective Action  
Replace rubber spacer.

Water comes out of fill opening on top of case when unit vents to reservoir.

- Problem Cause
  1. Reservoir overfilled.
  2. Cracked or loose condenser tube causing turbulence.
- Corrective Action
  1. Drain some water. With unit in standby and chamber dry, fill only to bottom of filler cup opening.
  2. Tighten or replace condenser tube.

Dark stains on instruments

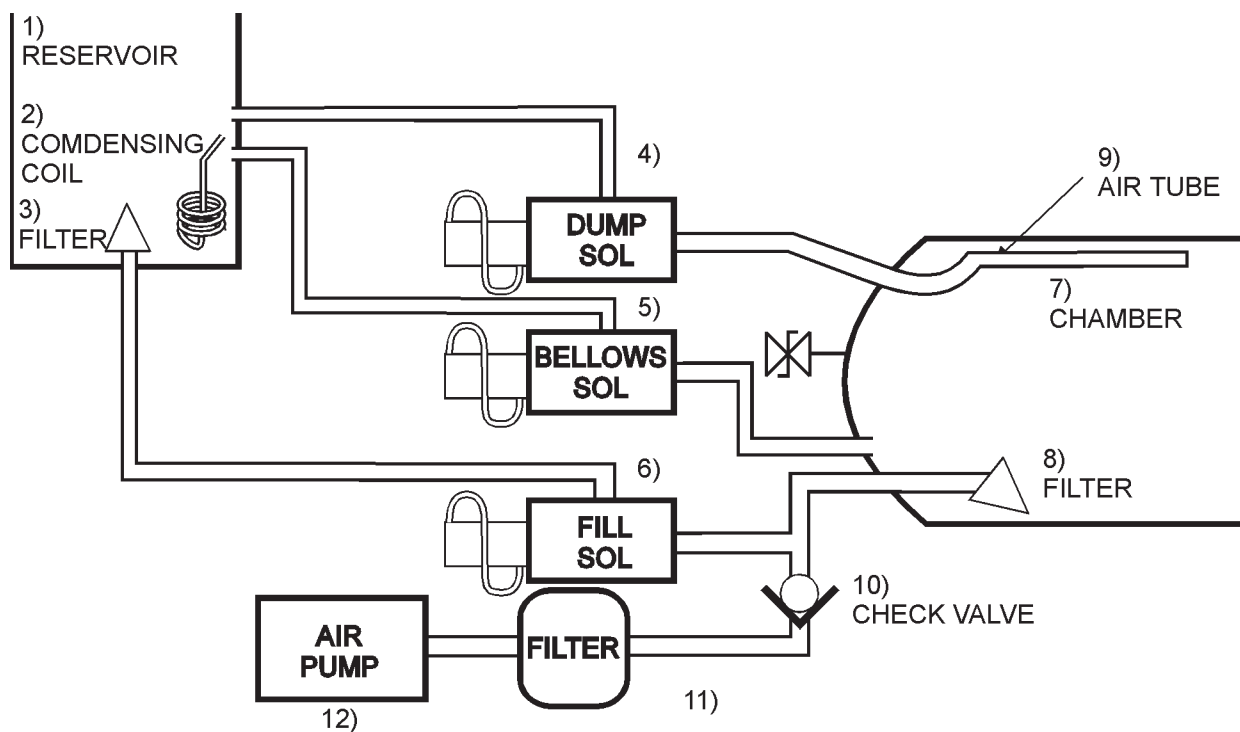
- Problem Cause
  1. Electroplating.
  2. Chlorine stains.
- Corrective Action for
  1. Do not mix dissimilar metals in the same package. Separate carbon steel, aluminum chrome and brass from stainless steel trays by using a tray liner.
  2. Do not use toweling or packaging which may contain chlorine bleach residue.

Chamber cracks

- Problem Cause  
Chlorine.
- Corrective Action  
Never use chlorine cleaners or materials in chamber. Wrapping materials should not be cleaned with chlorinated bleaches.

## Plumbing Diagram

1. Reservoir
2. Condensing Coil
3. Filter (Reservoir)
4. Dump Solenoid
5. Bellows Solenoid
6. Fill/Vent Solenoid
7. Chamber
8. Filter (Chamber)
9. Air Tube
10. Check Valve
11. Filter (Air)
12. Air Pump





The H2O alarm is a direct response from the Surface Sensor. The Surface Sensor is a temperature sensitive device that is fastened to the underside of the chamber. It monitors the temperature of the chamber and can distinguish, by the increase in temperature, when the water level has receded beyond a safe level. At this point (159° C.), the Surface Sensor opens and H2O is displayed. This is to prevent a boil dry situation that can ruin the heating element and chamber. This is caused by one of the following conditions: **A)** The chamber will not fill properly; **B)** The unit is not properly leveled; **C)** The chamber leaks under pressure; **D)** Defective or loose Surface Sensor or defective cable.

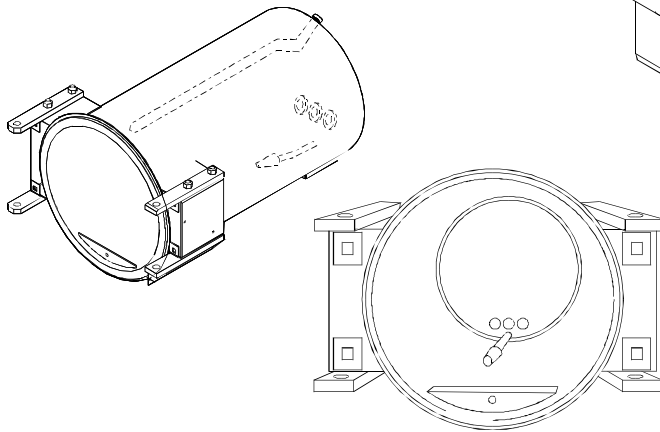
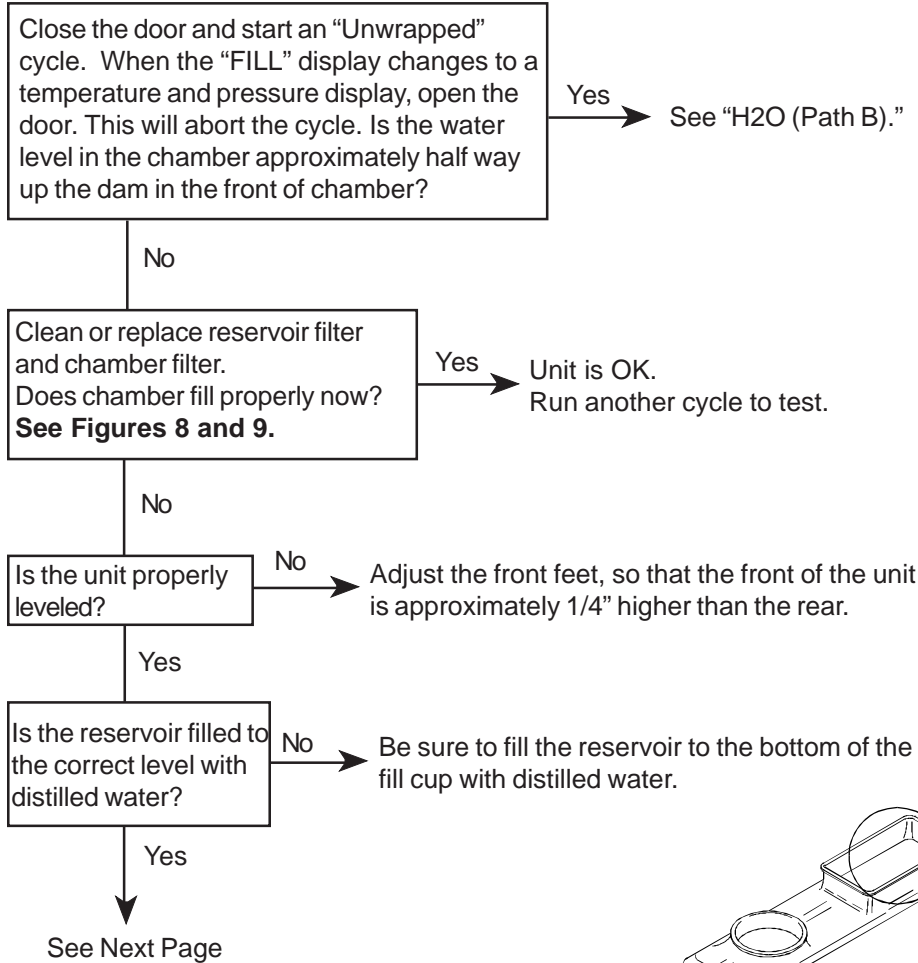


Figure 9.

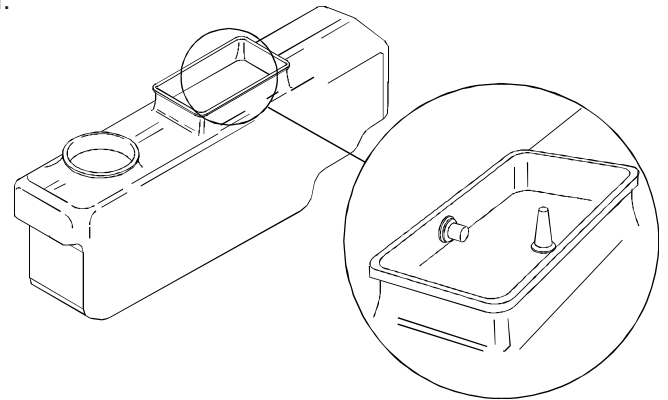


Figure 8.

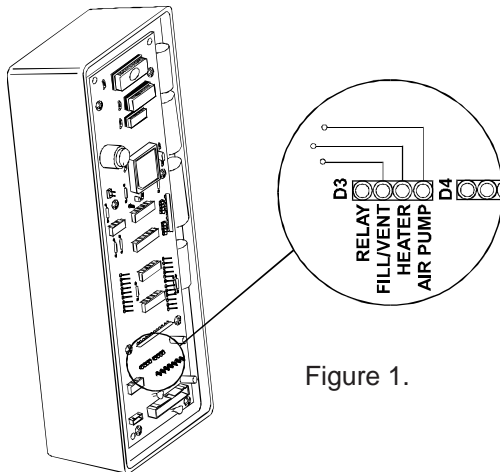
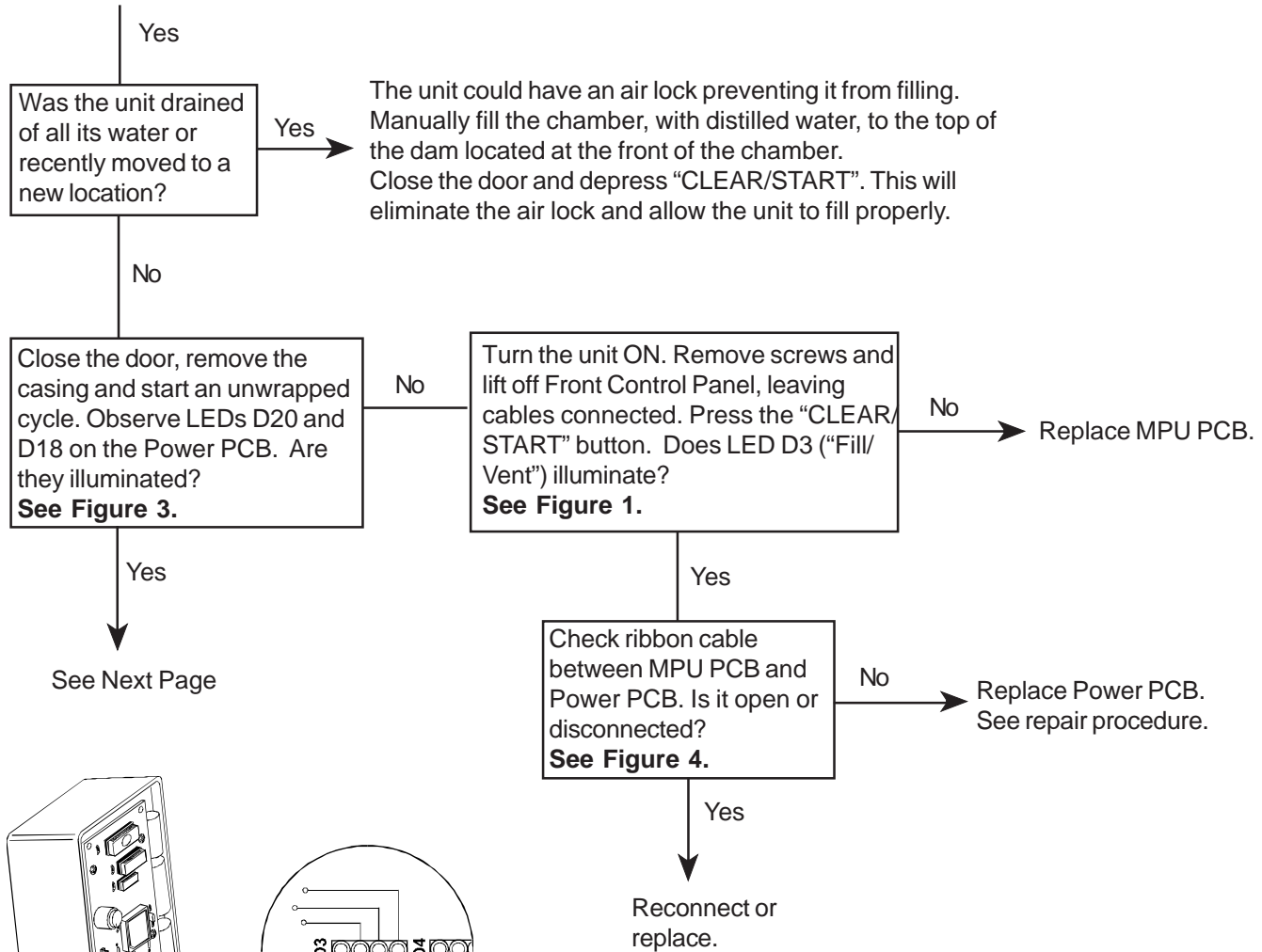


Figure 1.

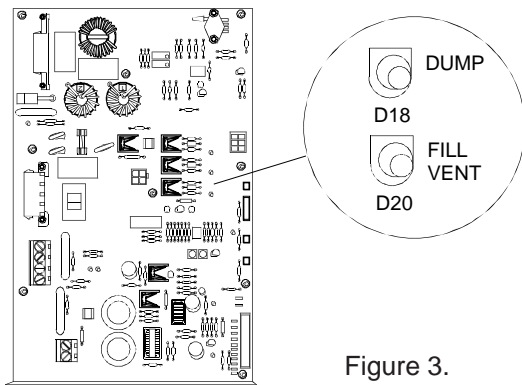


Figure 3.

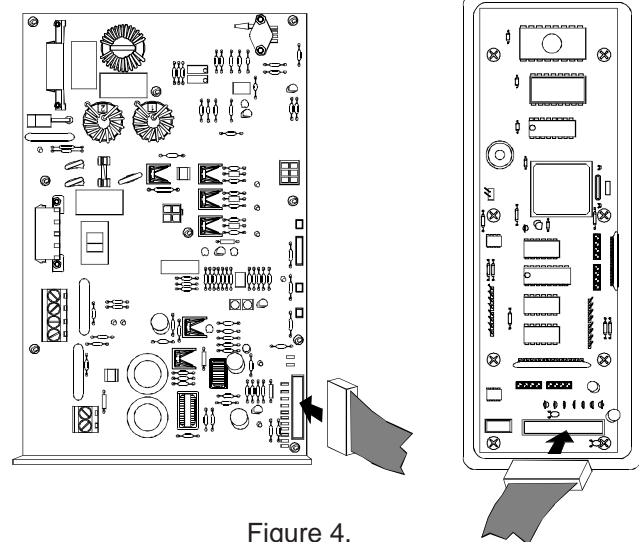


Figure 4.

## Troubleshooting H2O (Path A) - Unit Will Not Fill Properly (cont'd)

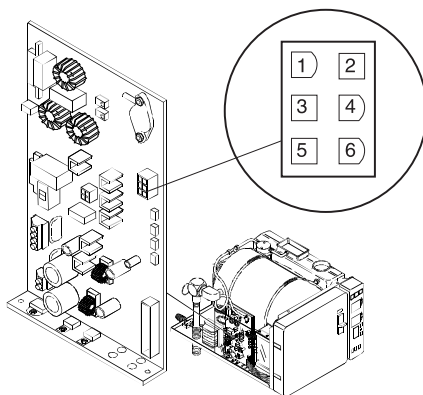
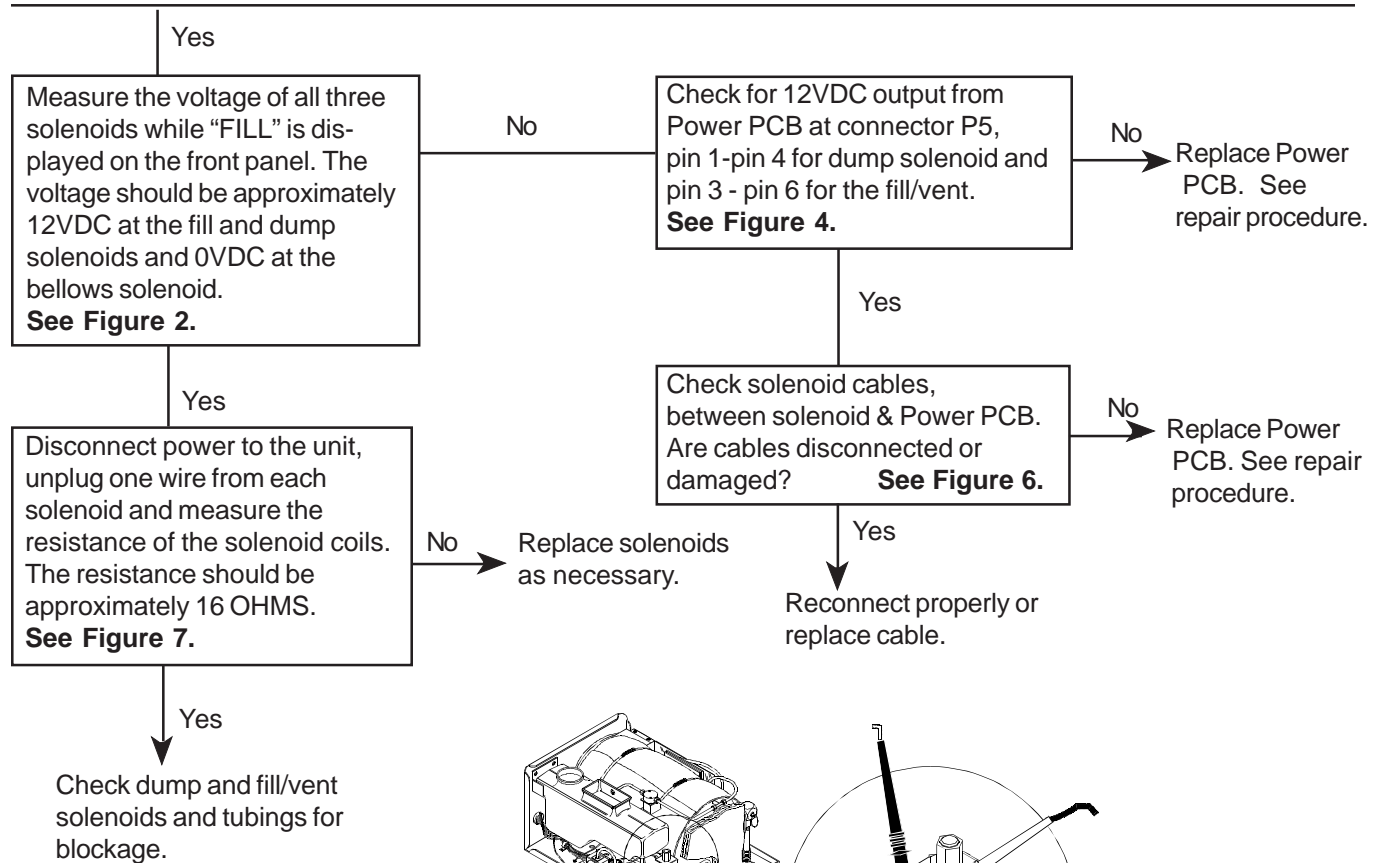


Figure 4.

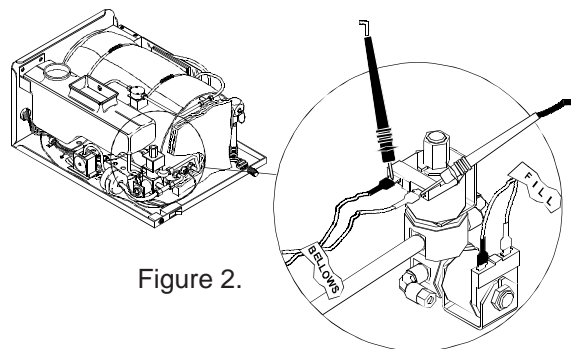


Figure 2.

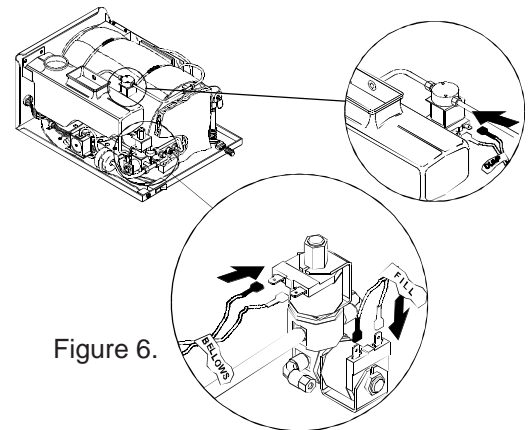


Figure 6.

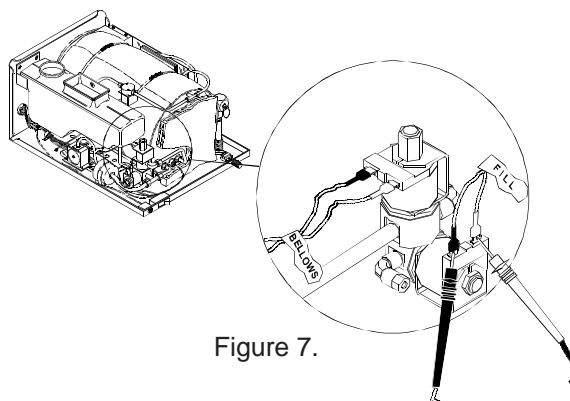


Figure 7.

## Troubleshooting H2O (Path B) - Chamber Loses Excessive Water

As the chamber begins to build pressure, excess water will start returning to the reservoir through the condensing coil via the bellows solenoid. At 90° C., the air purging process begins. This process opens and closes the bellows, while sampling for a pure steam atmosphere. The purging process is complete at 110° C. After this occurs, no water should return to the reservoir until sterilization is complete.

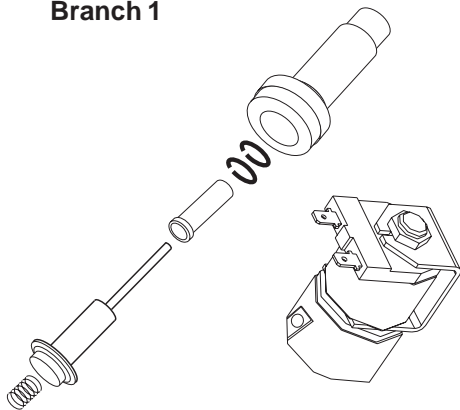
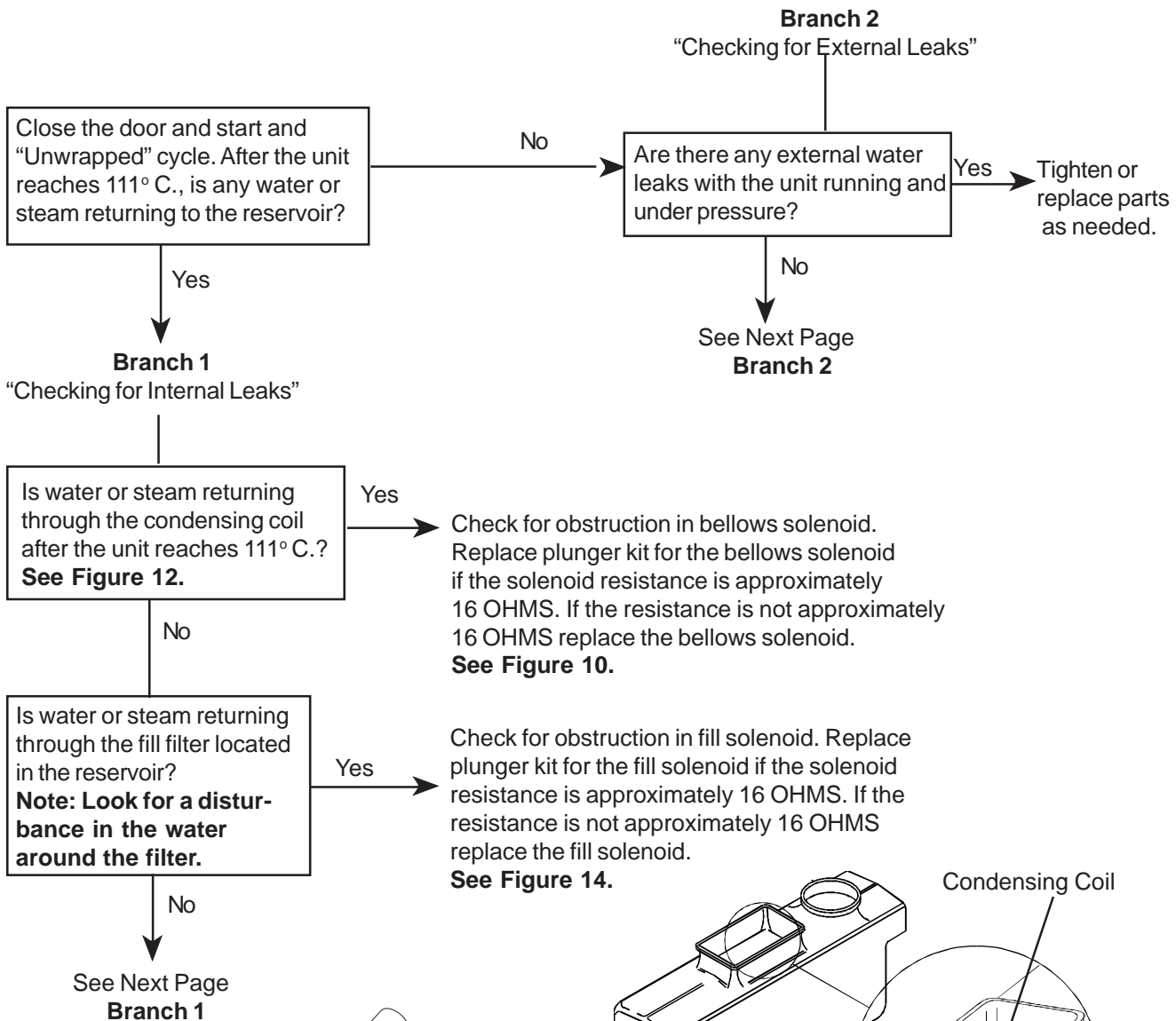


Figure 10.

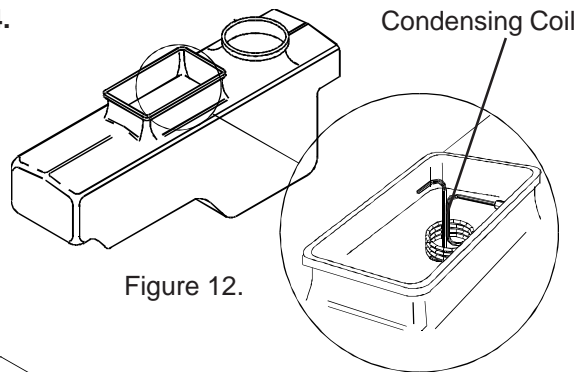


Figure 12.

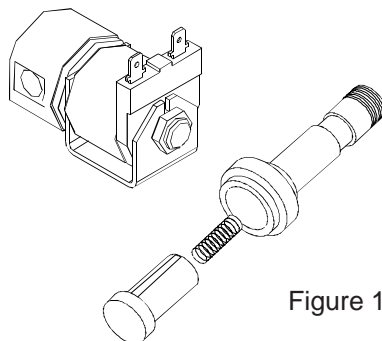
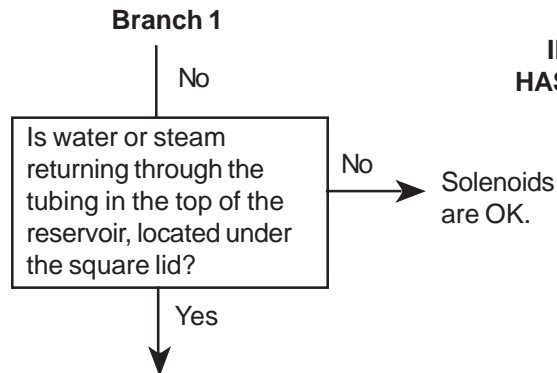


Figure 14.

## Troubleshooting H2O (Path B) - Chamber Loses Excessive Water (cont'd)



Check for obstruction in dump solenoid. Replace plunger kit for the dump solenoid if the solenoid resistance is approximately 16 OHMS. If the resistance is not approximately 16 OHMS replace the dump solenoid.

**See Figure 15.**

**!CAUTION!**  
IF ALL OF THESE CONDITIONS ARE MET AND THE UNIT STILL HAS H2O FAILURES, TIGHTEN HEATER BANDS AROUND CHAMBER AND/OR REPLACE SURFACE SENSOR.

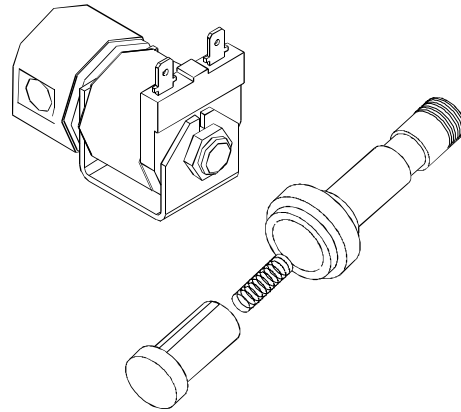


Figure 15.

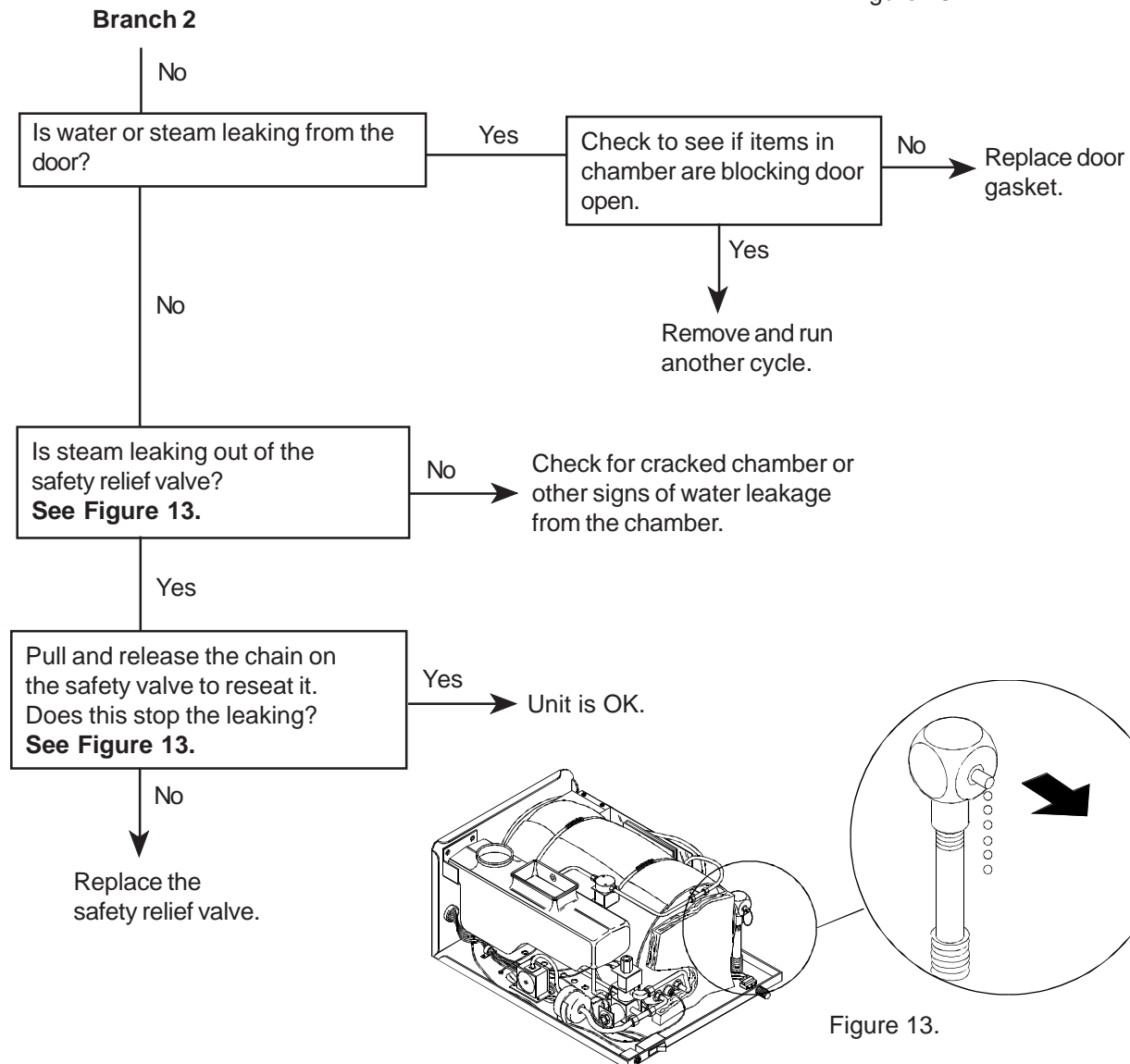


Figure 13.

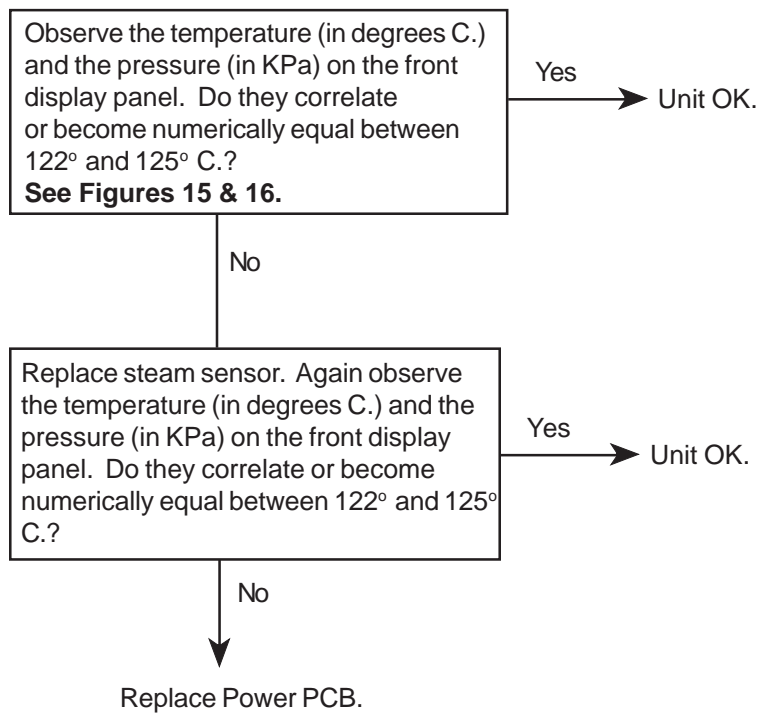


Figure 15.



Figure 16.

**Note: Program the unit to display temperature in degrees C., and pressure in KPa.**

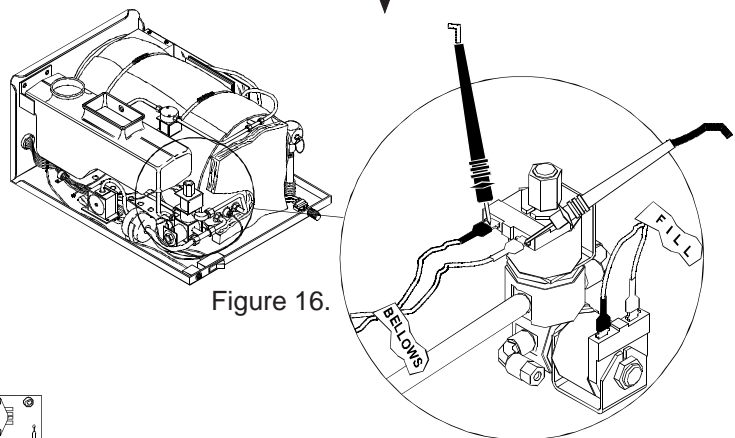
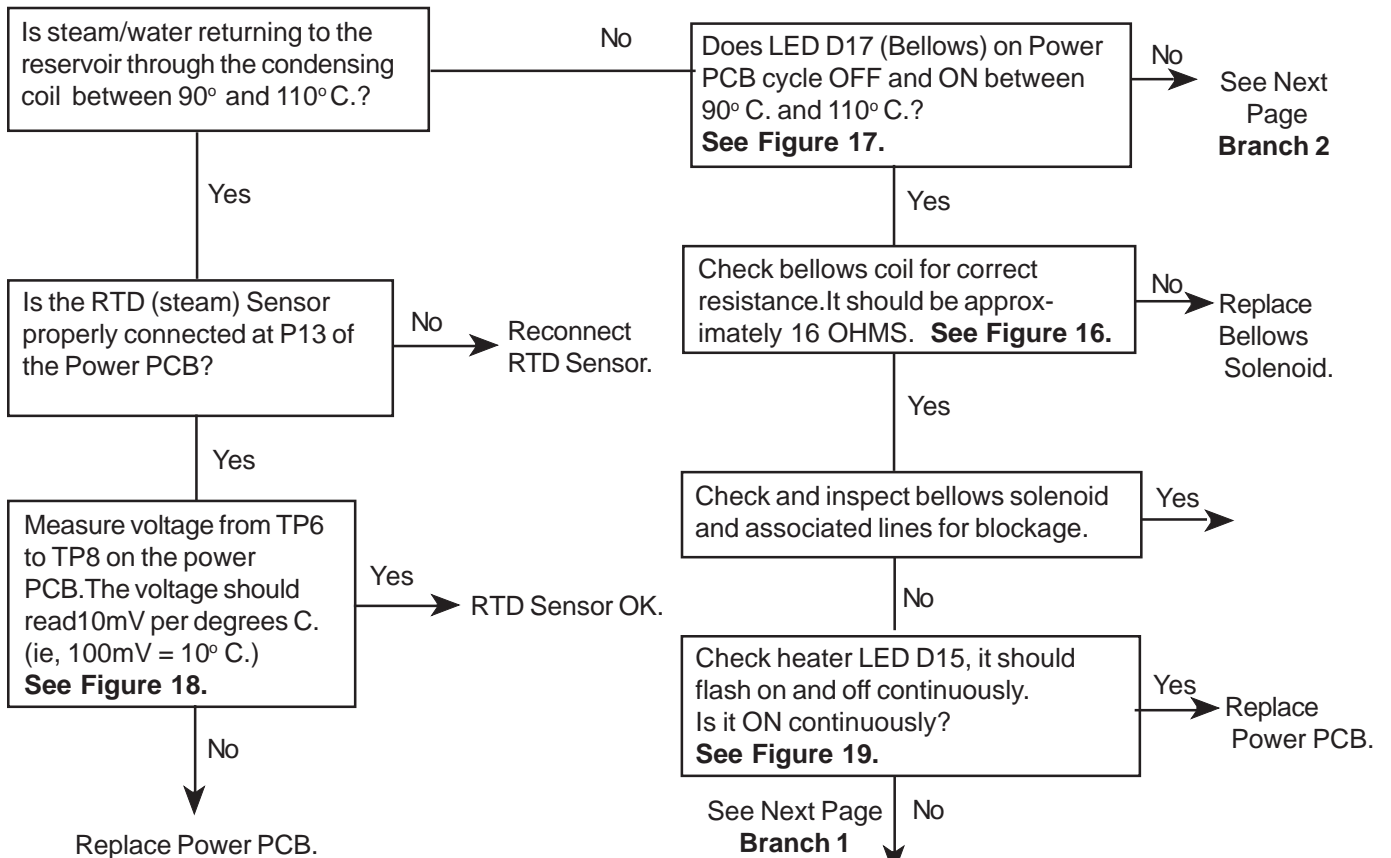


Figure 16.

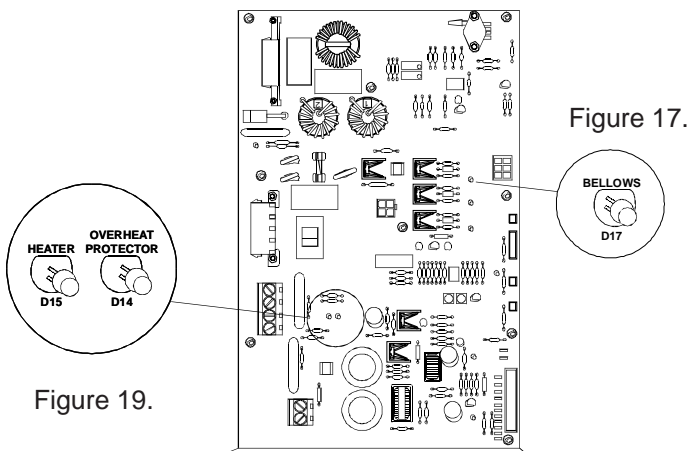


Figure 17.

Figure 19.

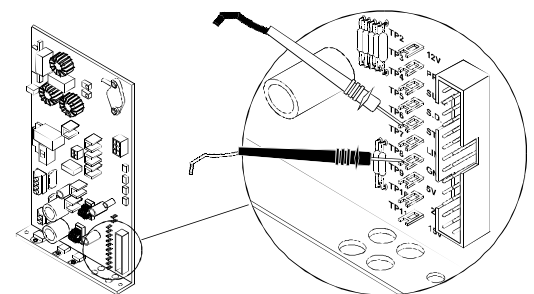
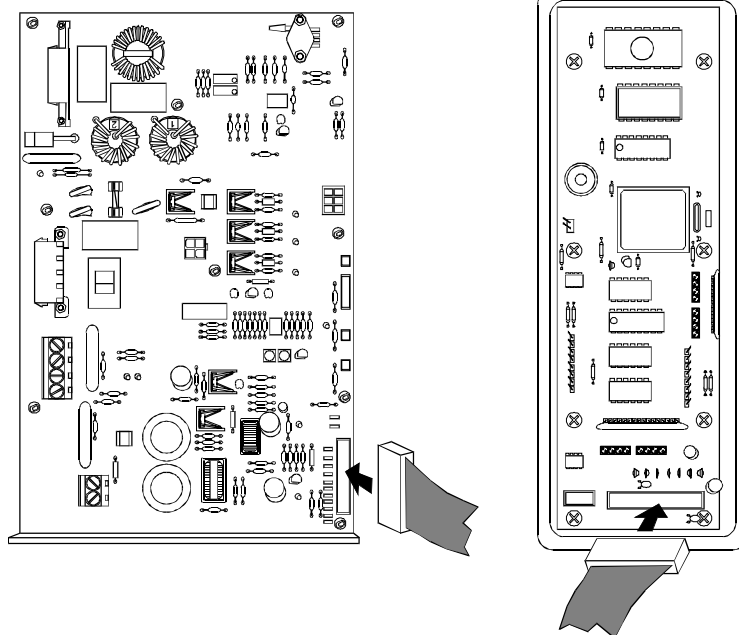
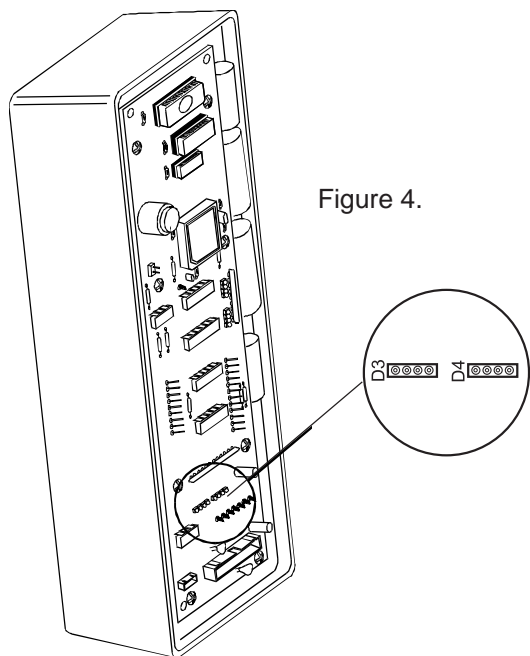
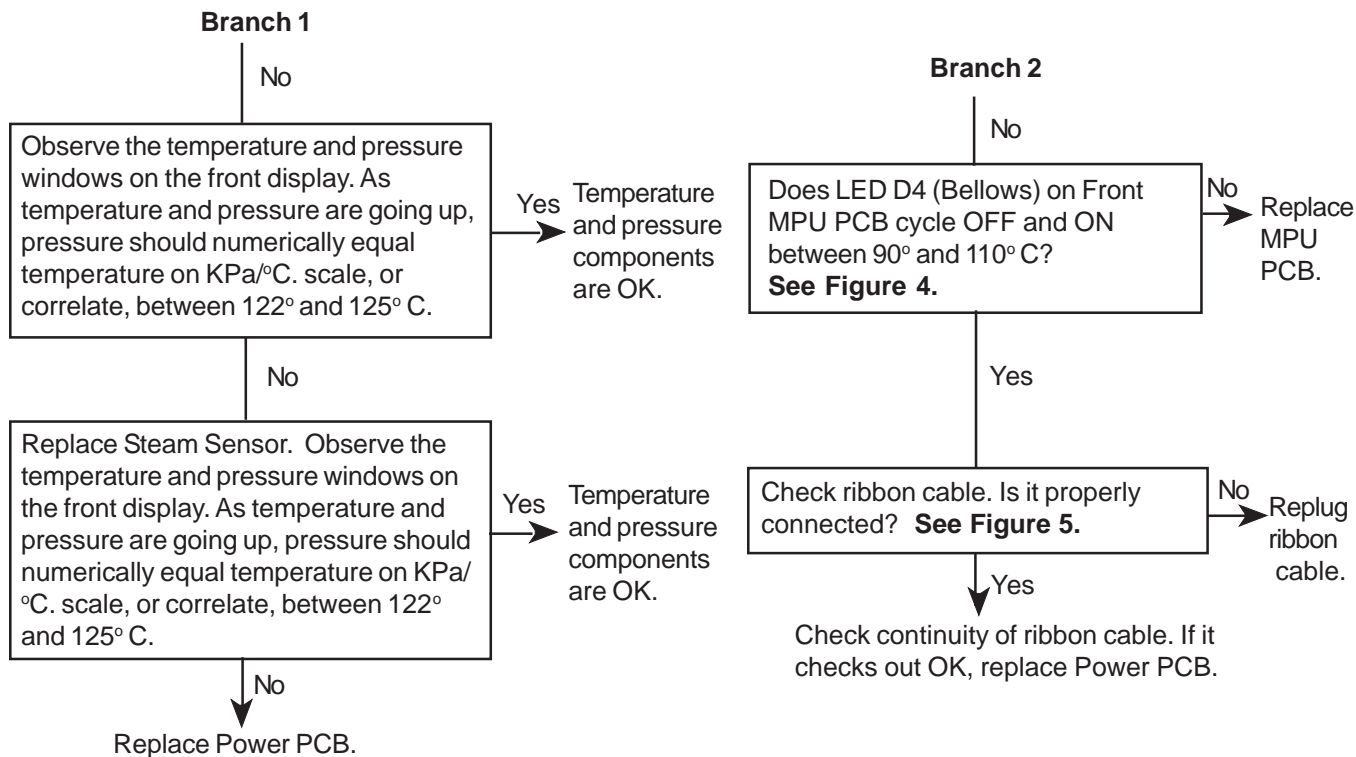


Figure 18.

**Note:** Program the unit to display temperature in degrees C., and pressure in KPa.





The Fail alarm is a response from several different sensors and aborts the cycle because a condition has been detected that will not allow the completion of a successful cycle. The following conditions will cause a Fail alarm: **A)** The air purging cycle (between 101° C. and 110° C.) takes more than 7 minutes; **B)** The unit takes more than 45 minutes to reach sterilization parameters; **C)** During the "Sterilization" portion of the cycle, the chamber temperature or pressure drops below minimum parameters for 3 minutes (accumulated time); **D)** The door circuit is interrupted after the "Fill" portion of a cycle is complete.

**Note: The first three conditions will show a constant "Fail" display. The fourth condition flashes "Fail".**

The microprocessor allows 7 minutes for the unit to purge air out of the chamber. This process begins at 90° C., and ends at 110° C.

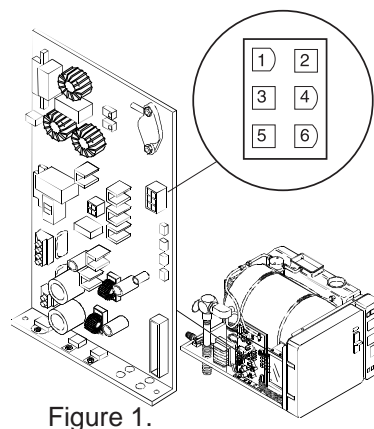
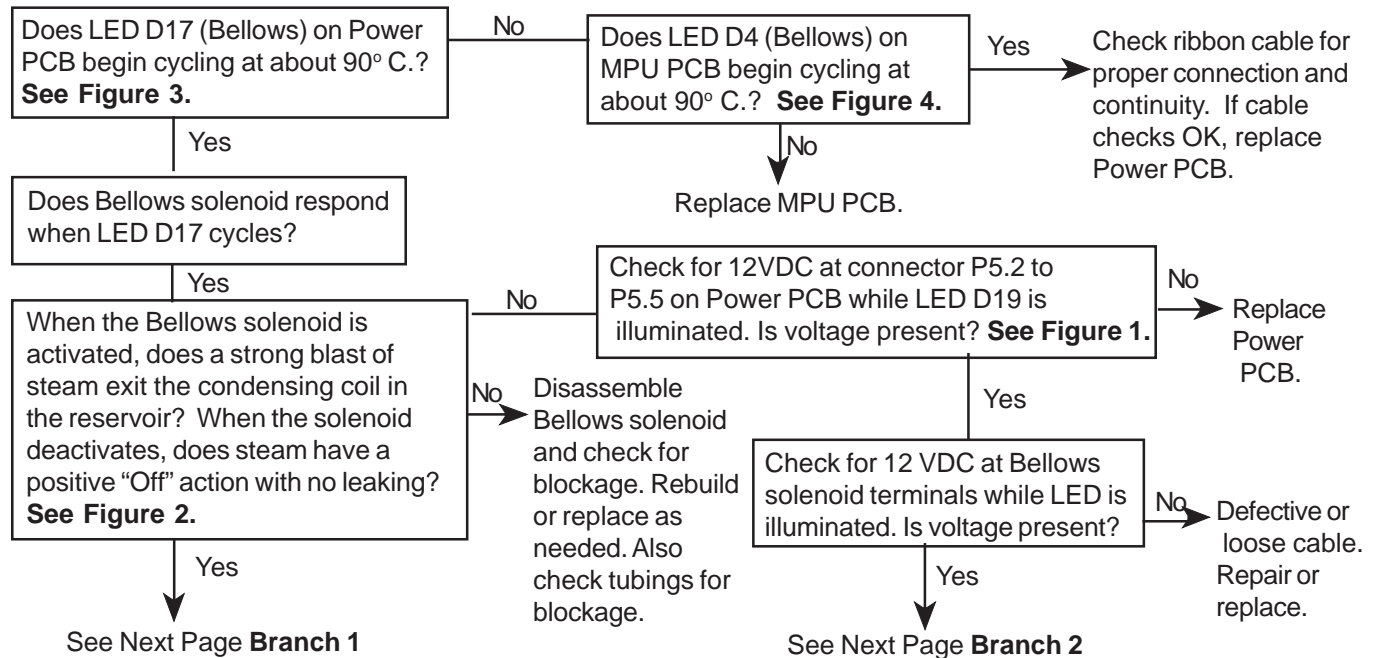


Figure 1.

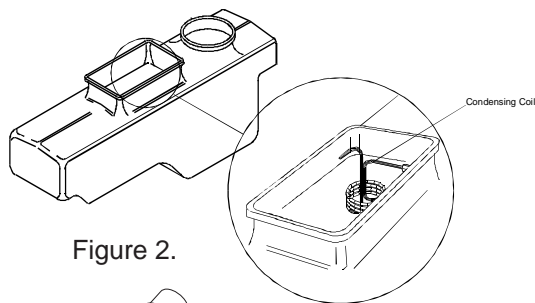


Figure 2.

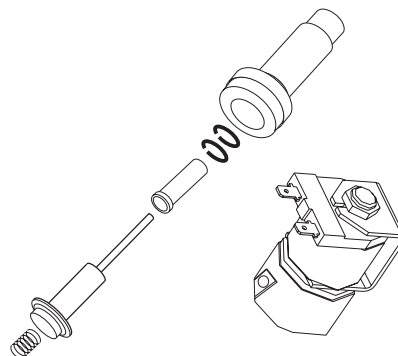


Figure 3.

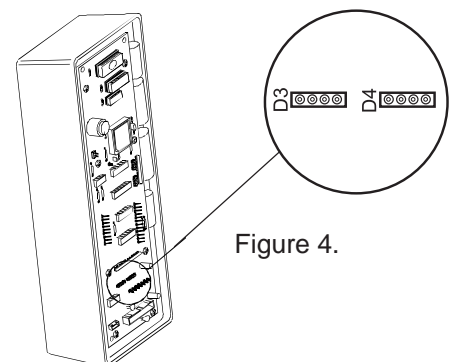


Figure 4.

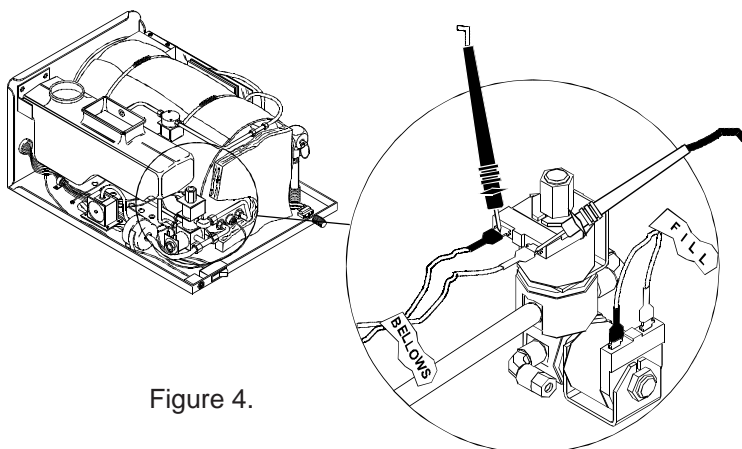
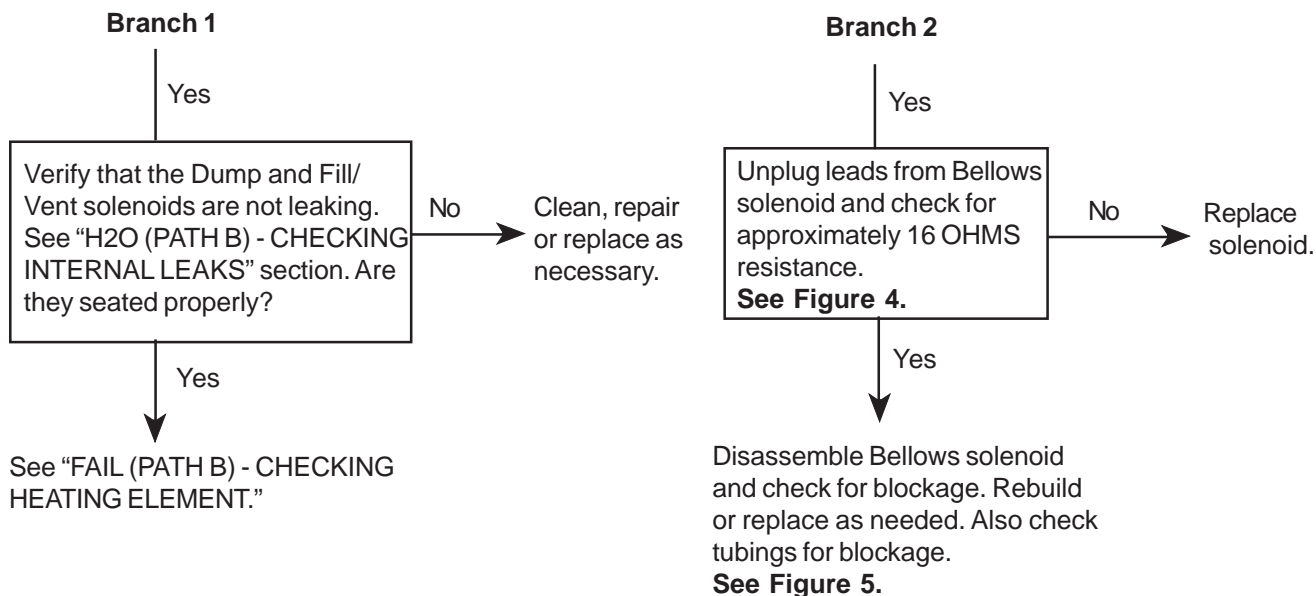


Figure 4.

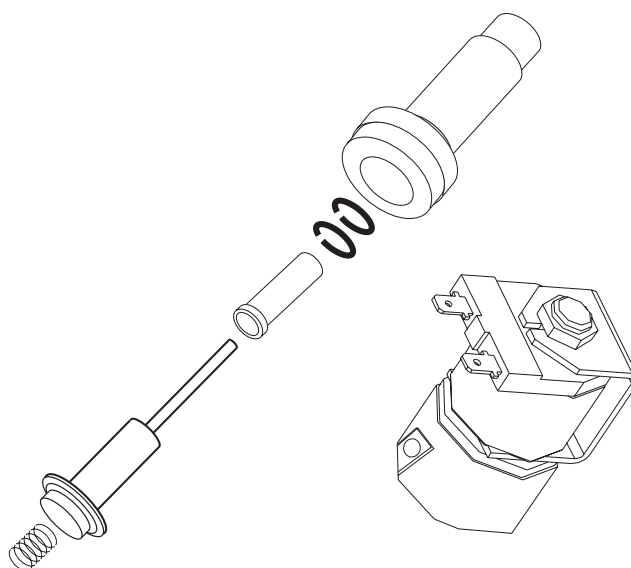


Figure 5.

## Troubleshooting Fail (Path B) - Unit Fails Between 110° C & Sterilization Target

Unit takes more than 45 minutes to reach sterilization.

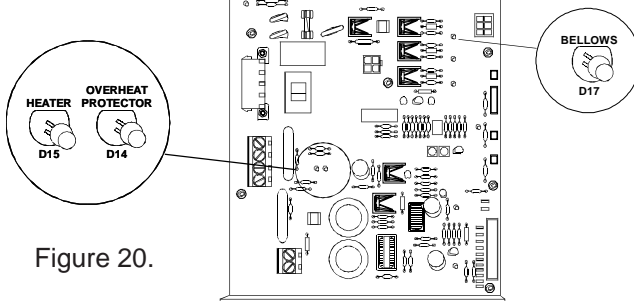
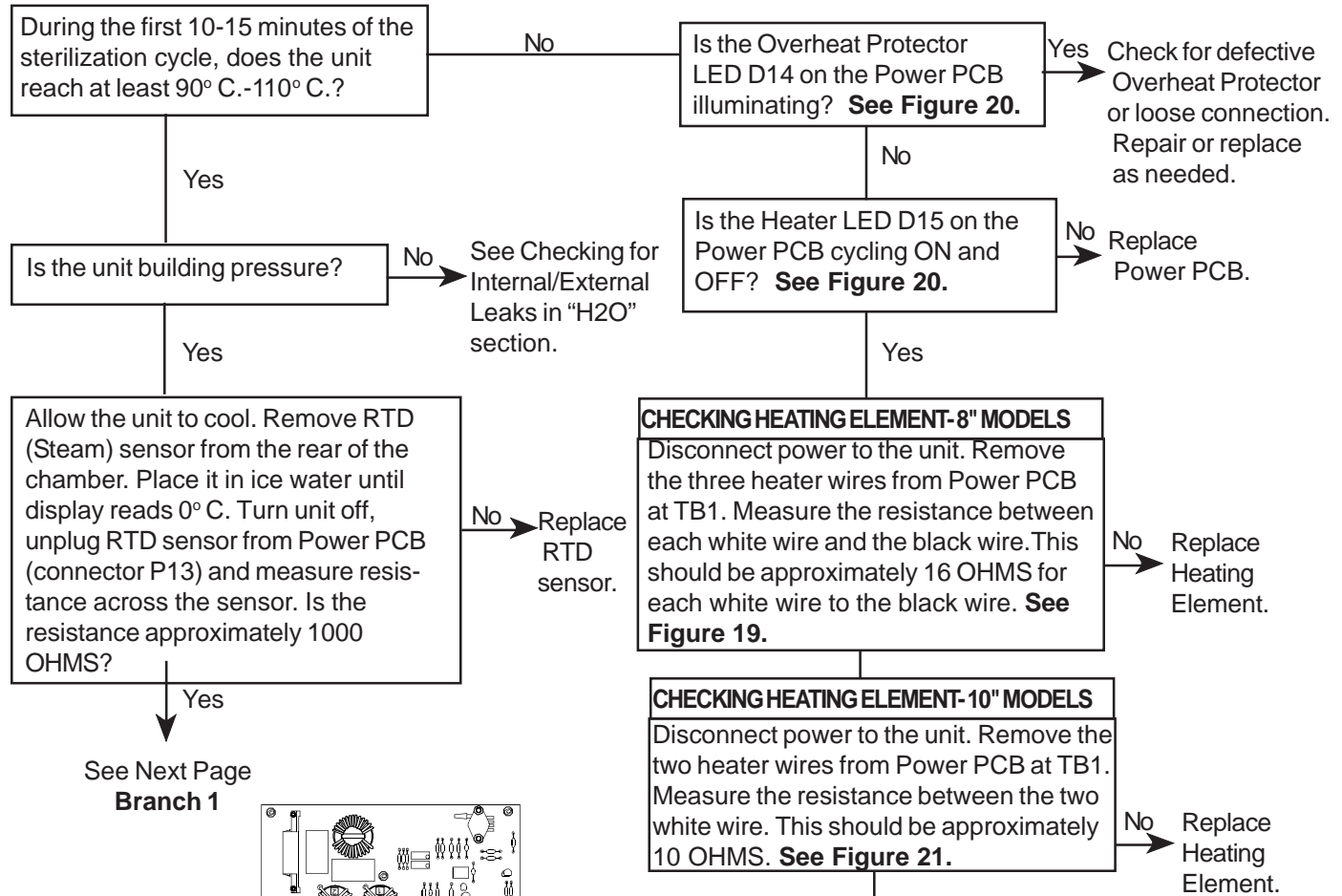
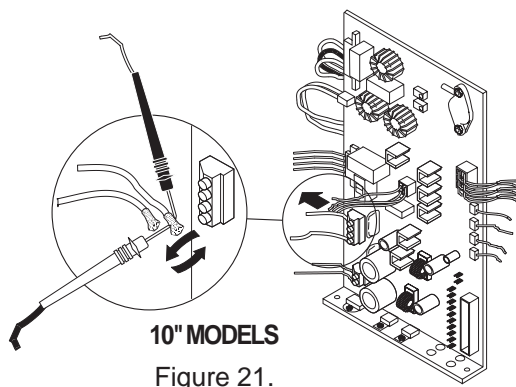
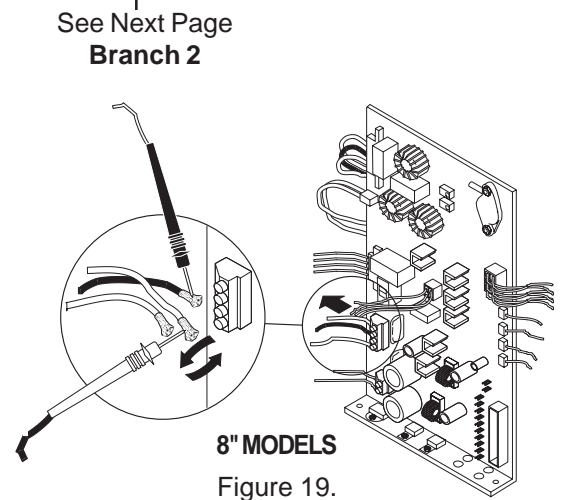


Figure 20.



10" MODELS  
Figure 21.



8" MODELS  
Figure 19.

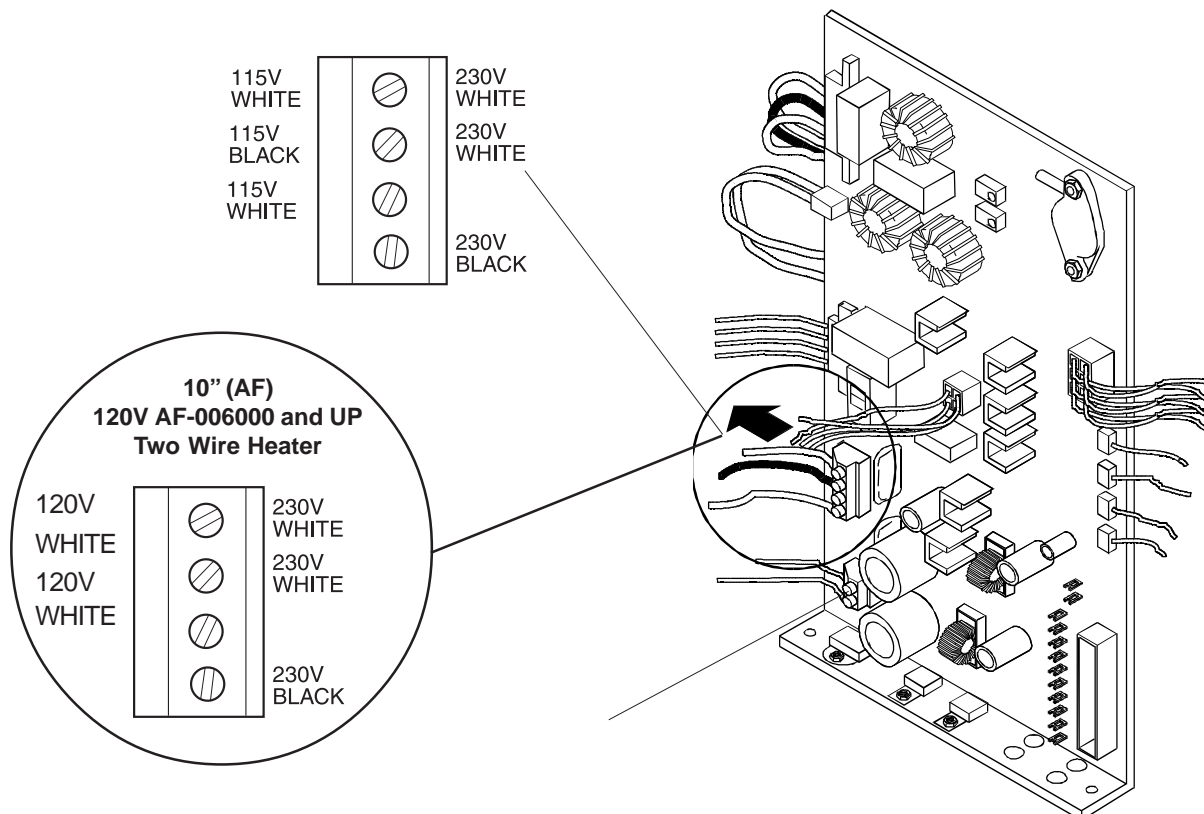
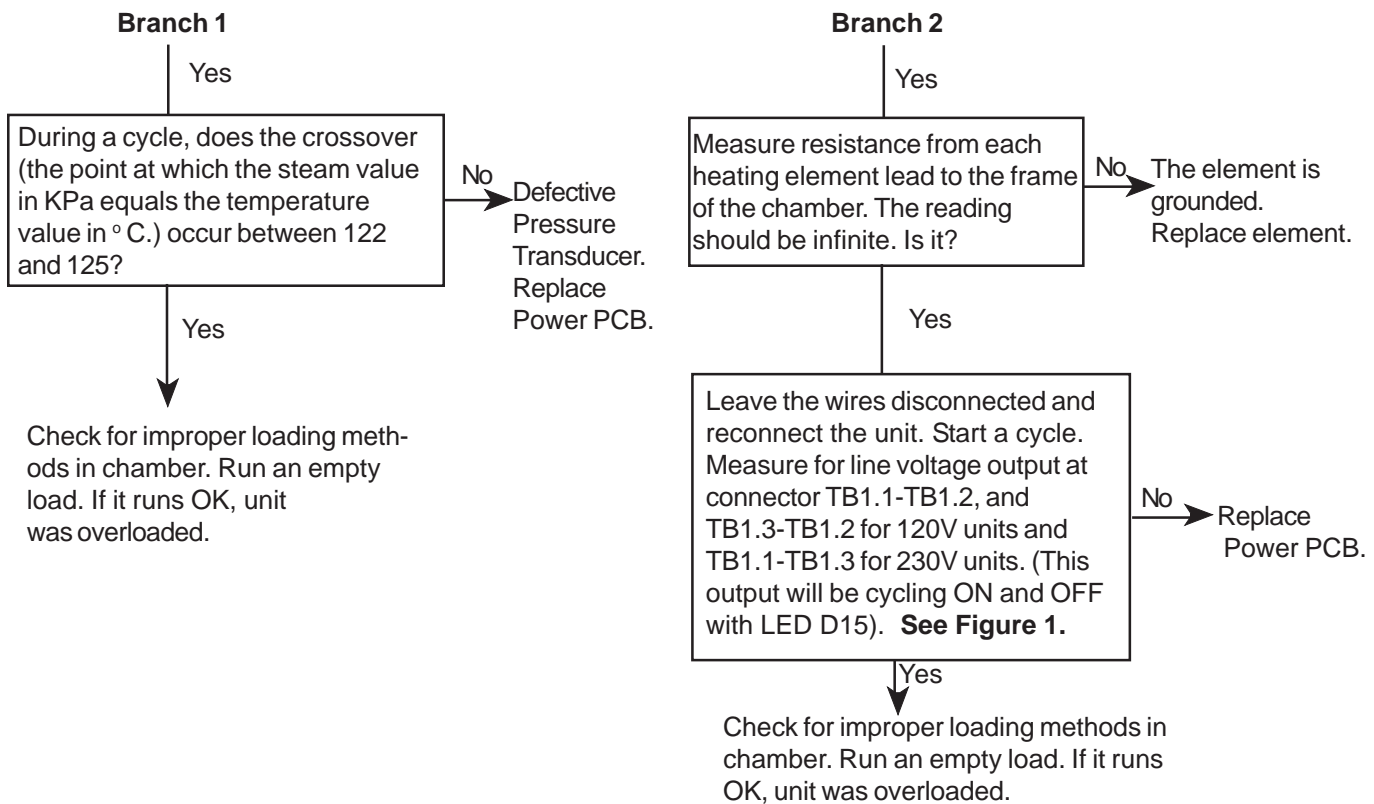
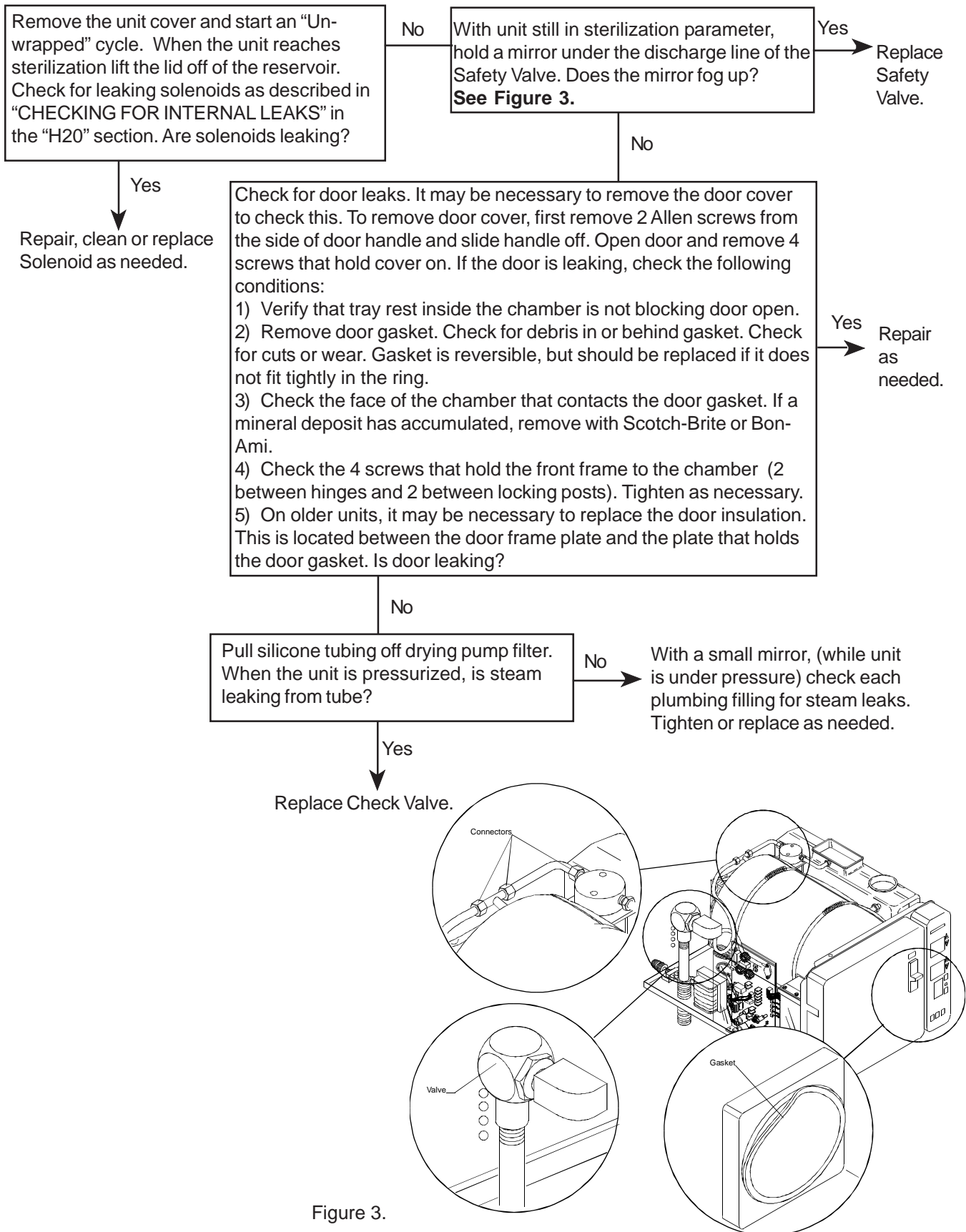


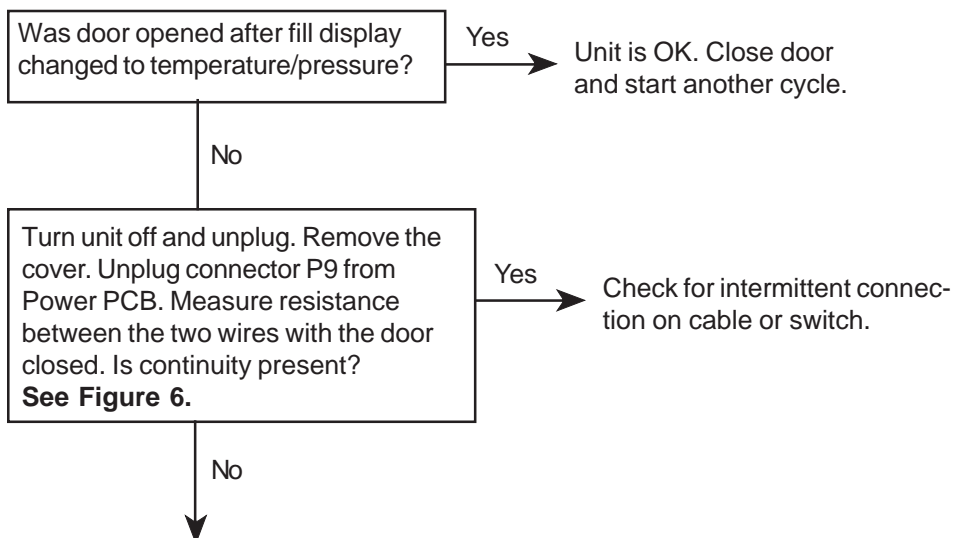
Figure 1.

## Troubleshooting Fail (Path C) - Unit Fails After Reaching Sterilization Parameters

If the unit fails during this portion of the cycle, it is due to a steam leak.



Door switch circuit was interrupted after "Fill" function was completed.



Check condition of the cable. Replace if damaged. If cable is OK, remove the 2 nuts securing the door switch cover just below the lower door locking tab. The switch closes the circuit when depressed. Readjust, tighten or replace switch as needed.

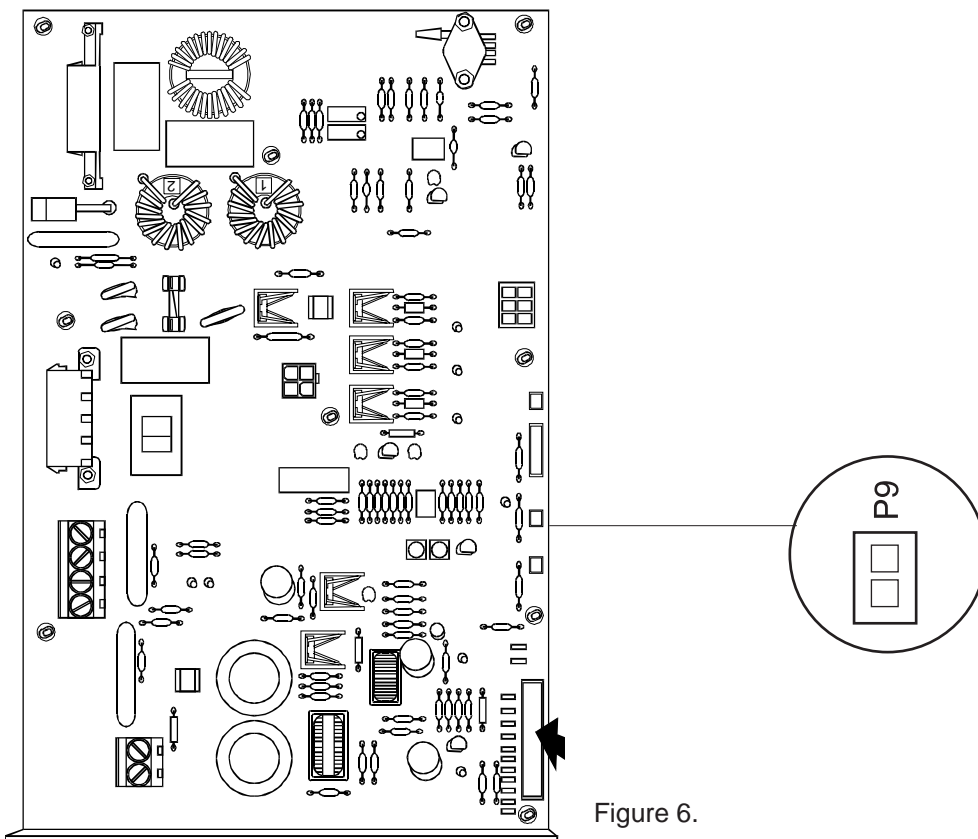


Figure 6.

**Note:** Be certain the chamber has not been overloaded. See User Manual. If not overloaded, continue below.

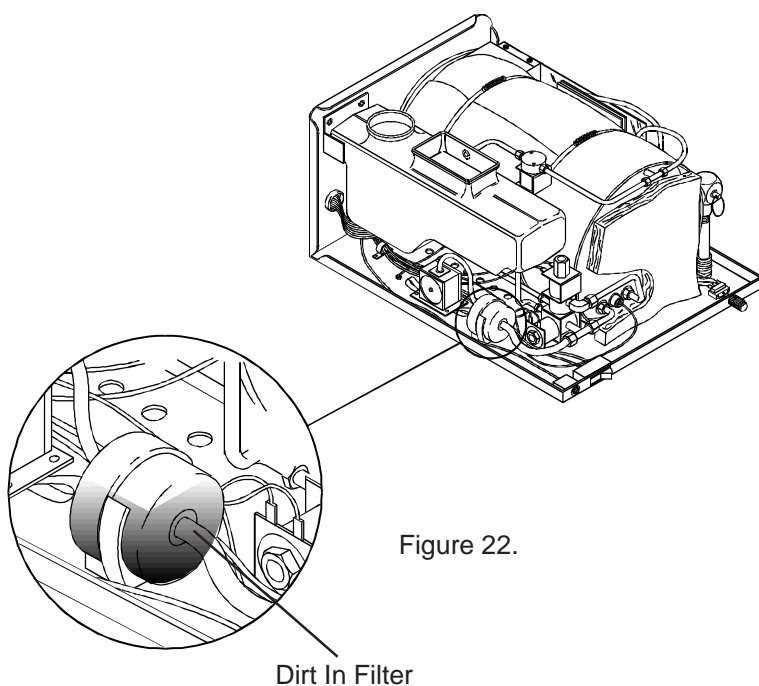
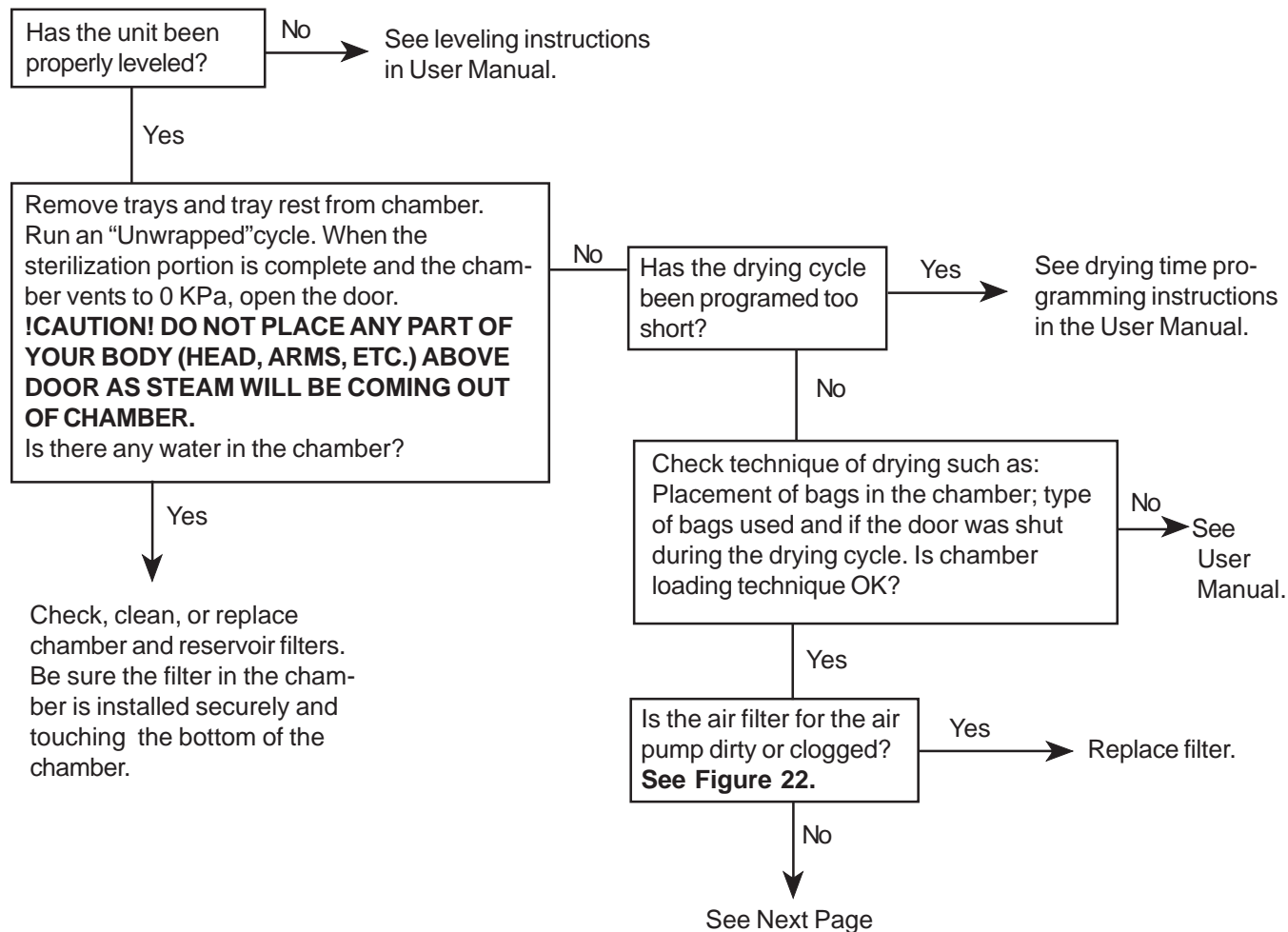
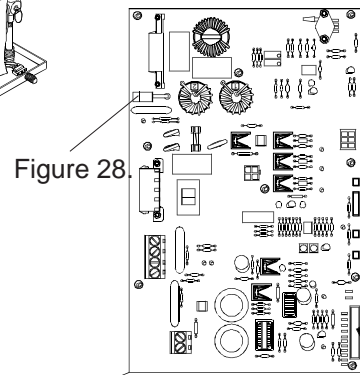
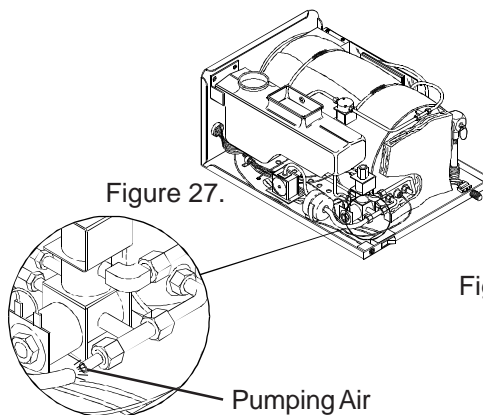
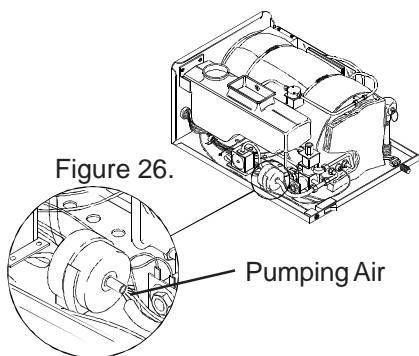
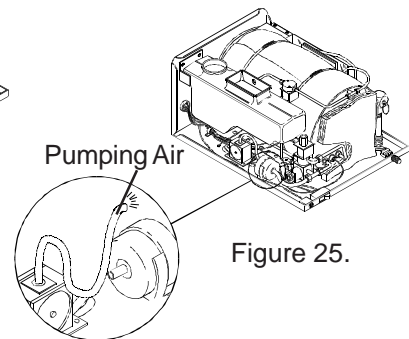
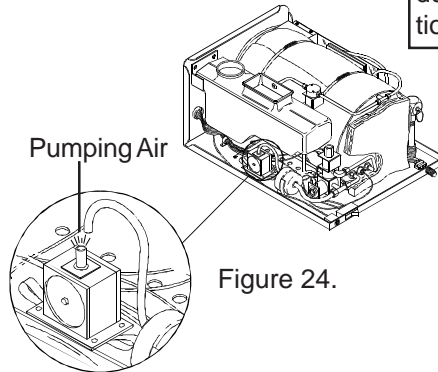
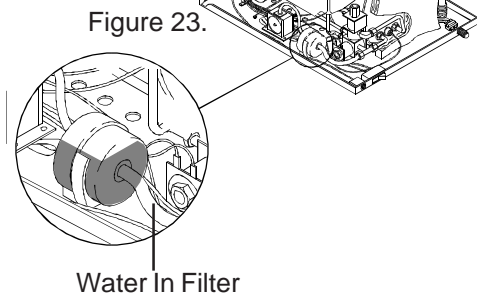
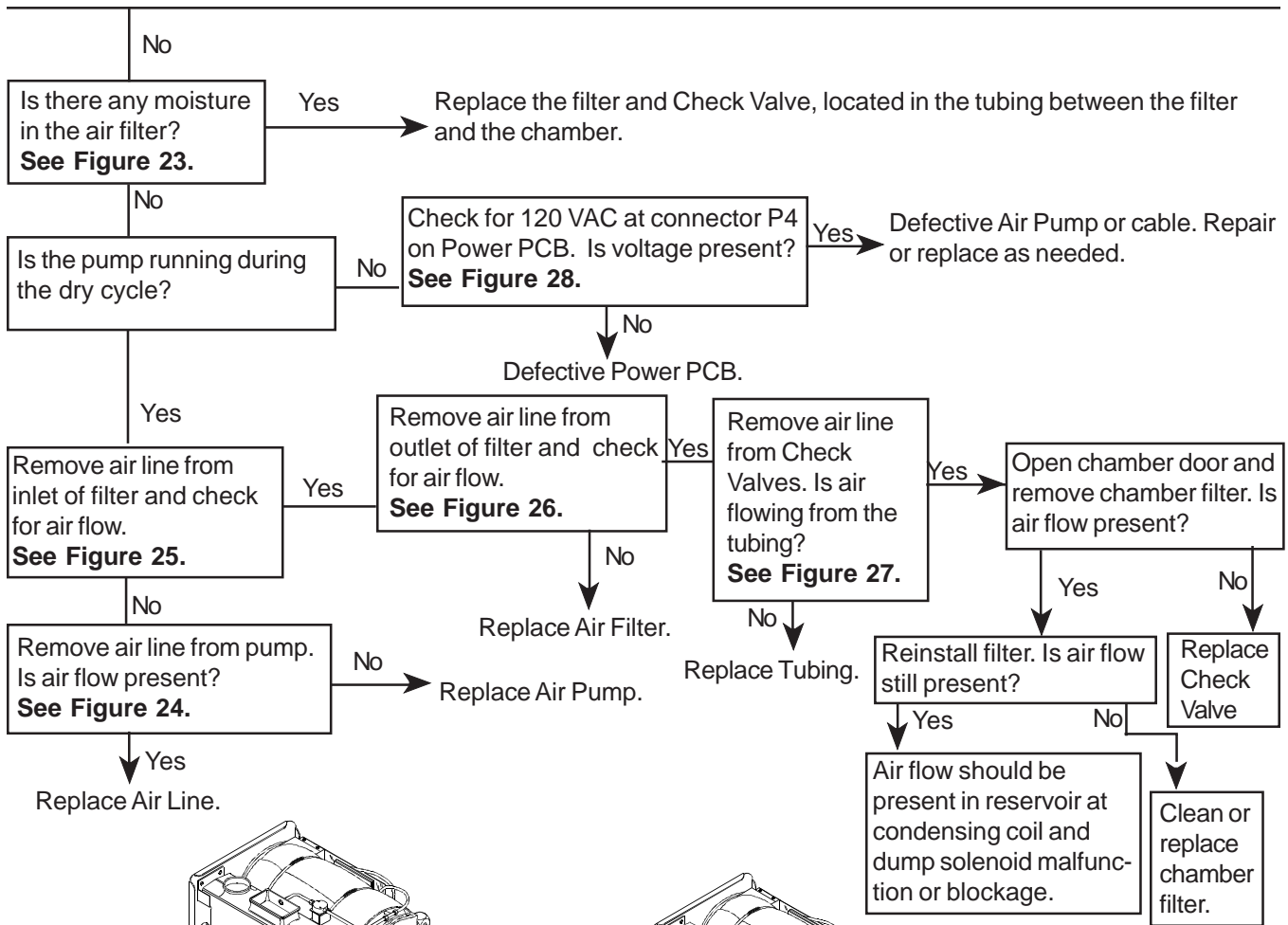


Figure 22.







## Troubleshooting

### Unit Will Not Turn On

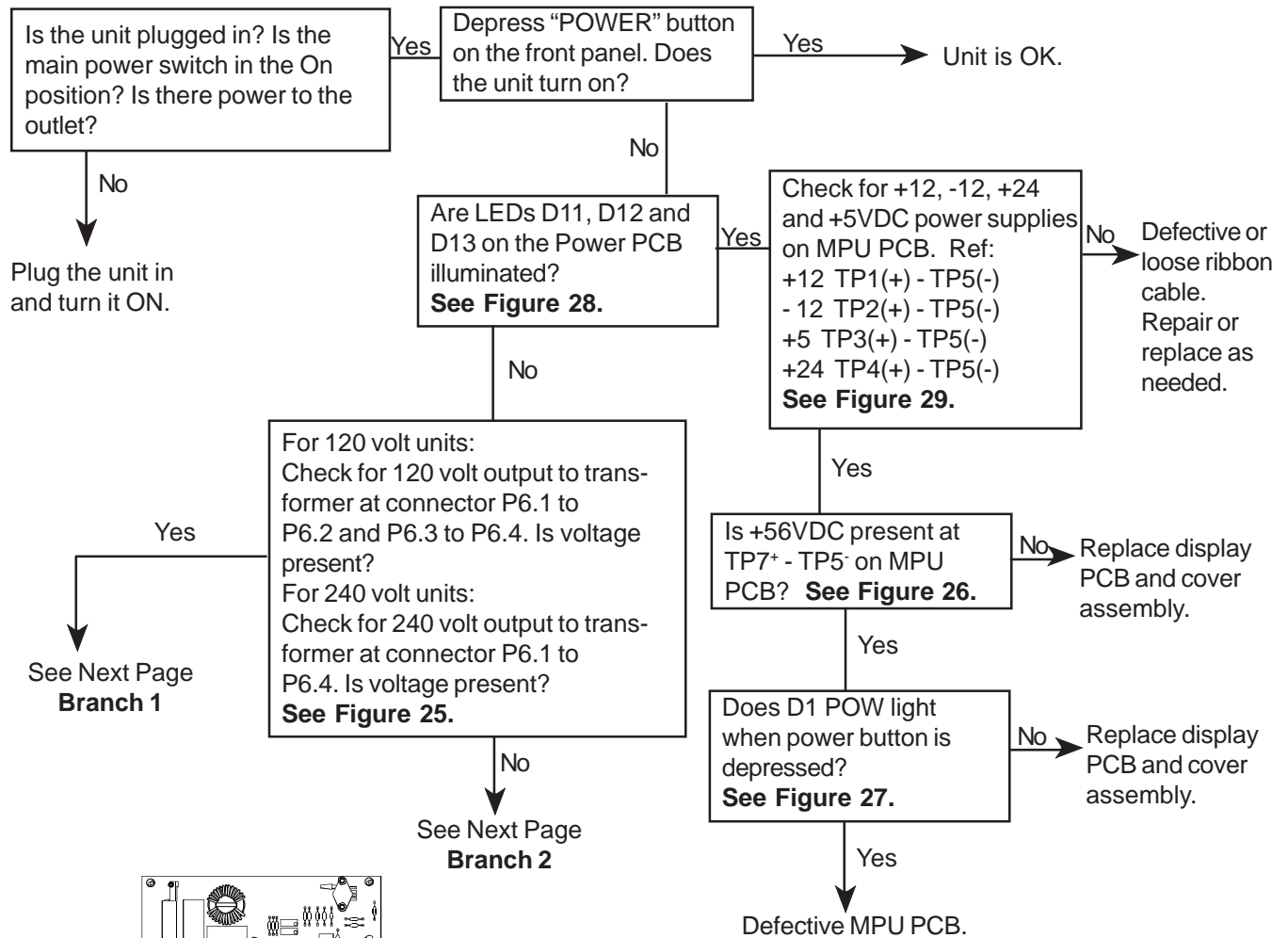


Fig. 25.

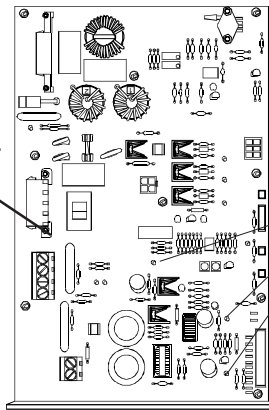


Figure 28.

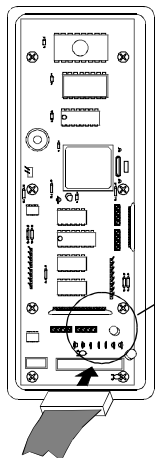
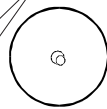


Figure 26.

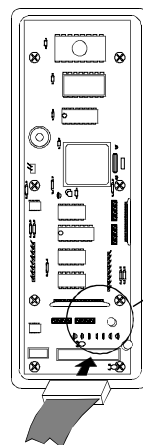


Figure 29.

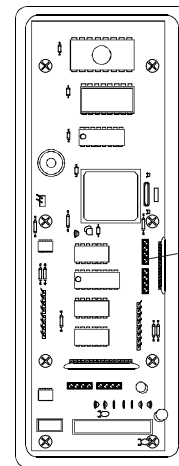


Figure 27.

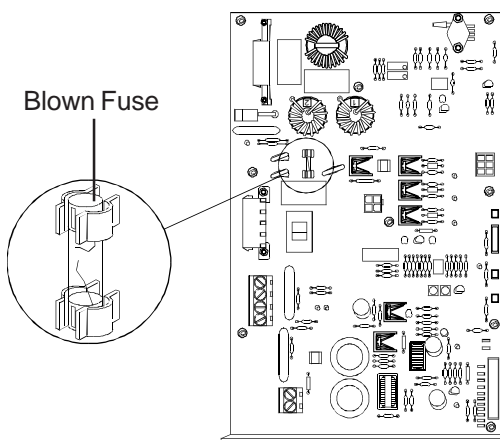
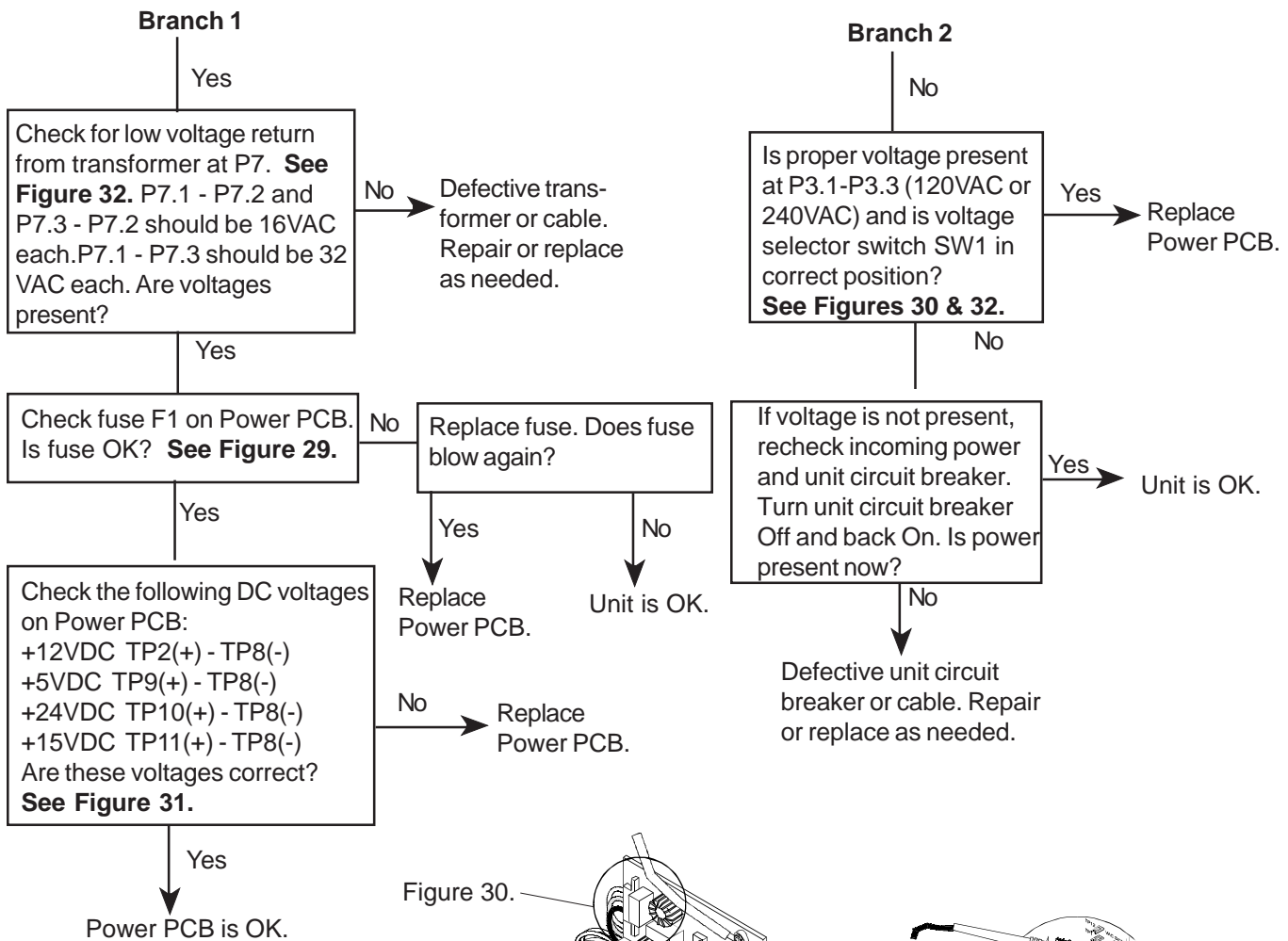


Figure 29.

Figure 30.

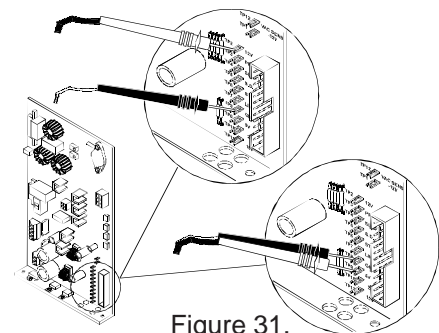
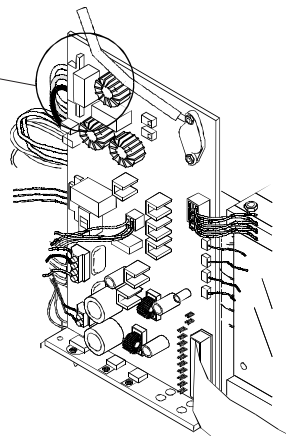


Figure 31.

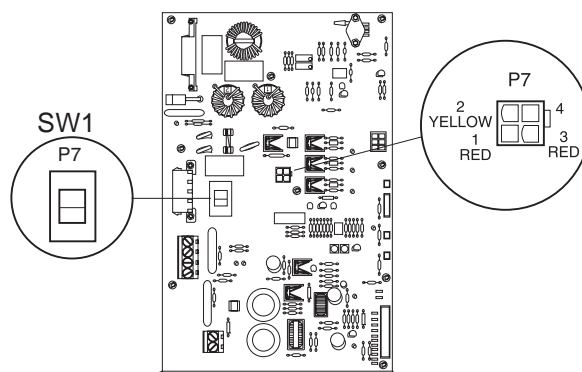
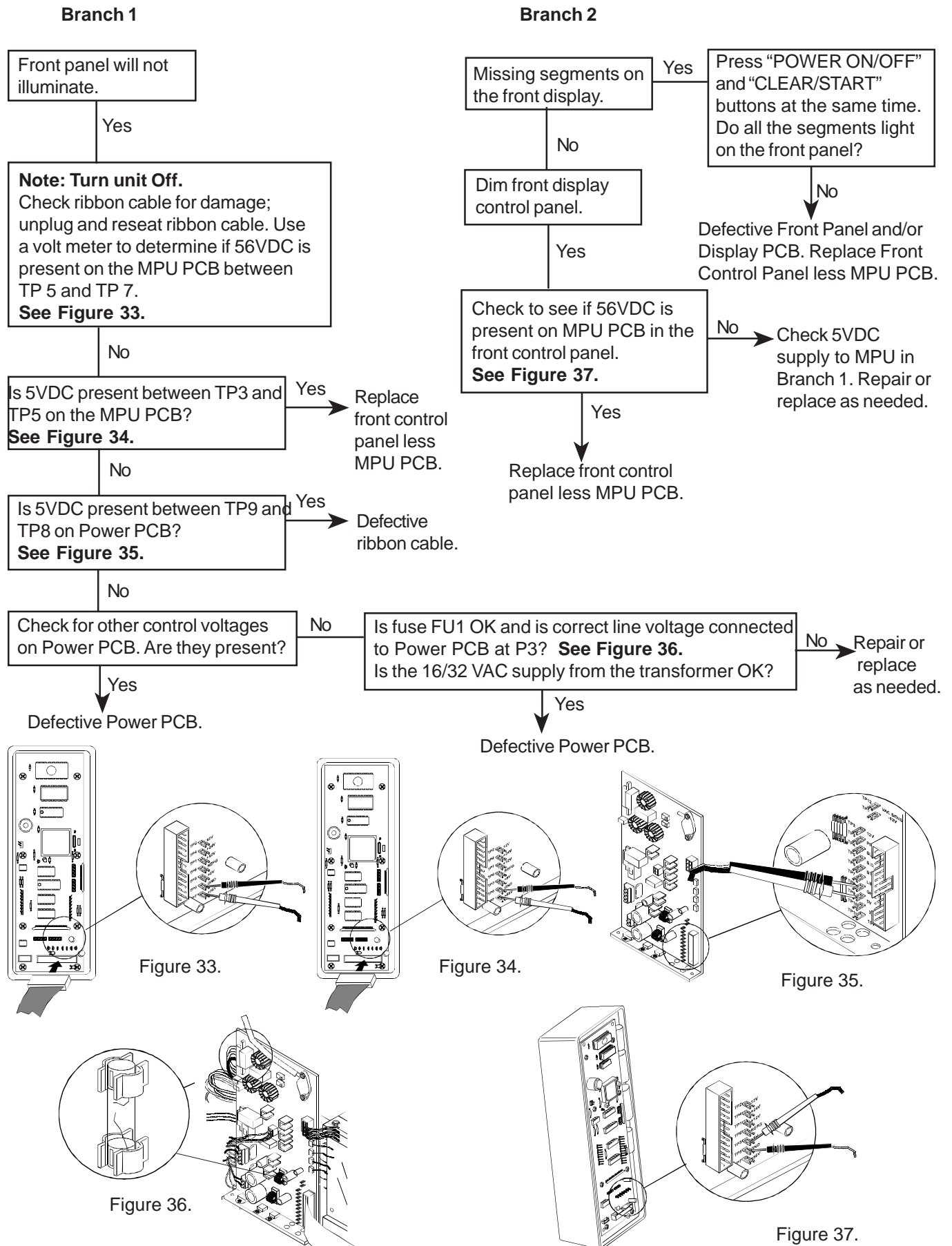


Figure 32.



## Troubleshooting

## Cosmetic Problems

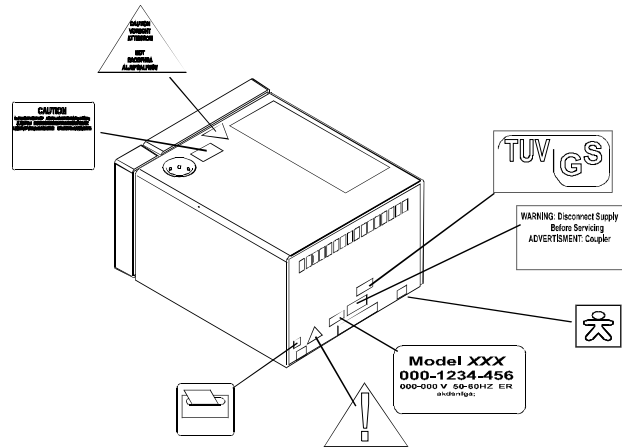
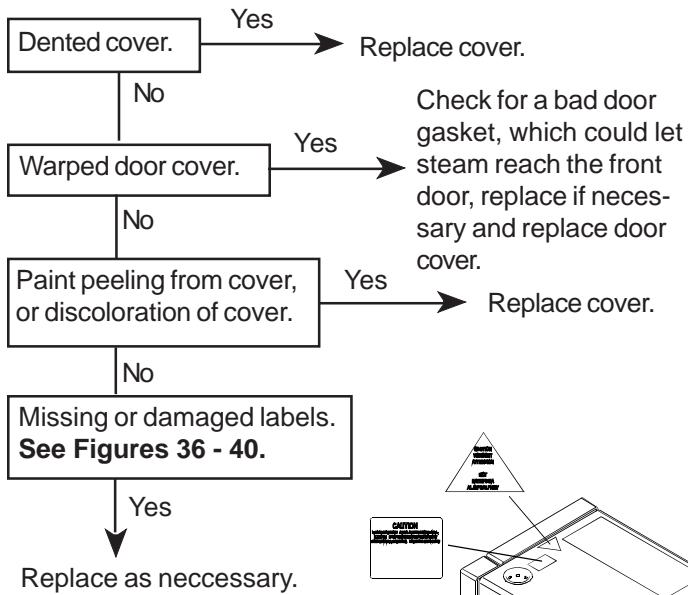


Figure 36.-TUV 230V

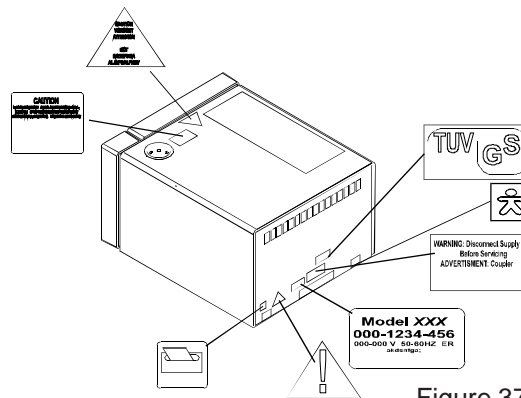


Figure 37.-Delta 230V

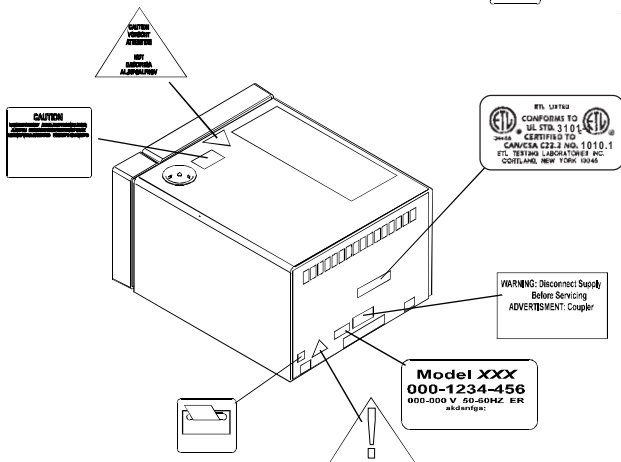


Figure 38.-Delta 120V

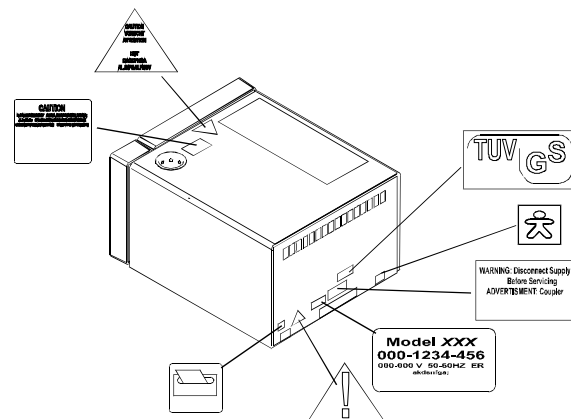


Figure 39.-Siemens 230V

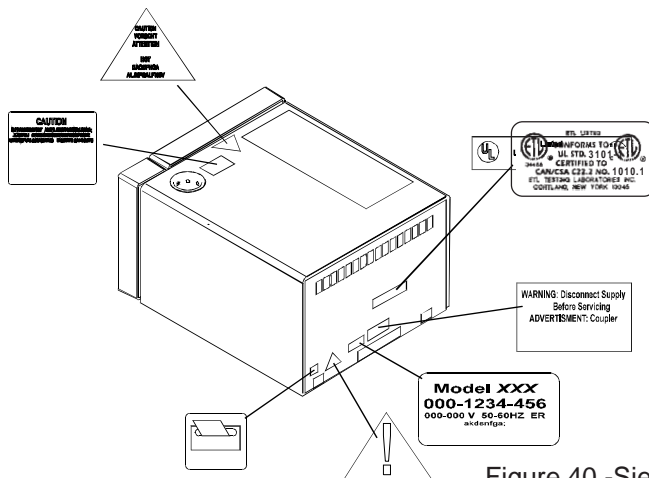
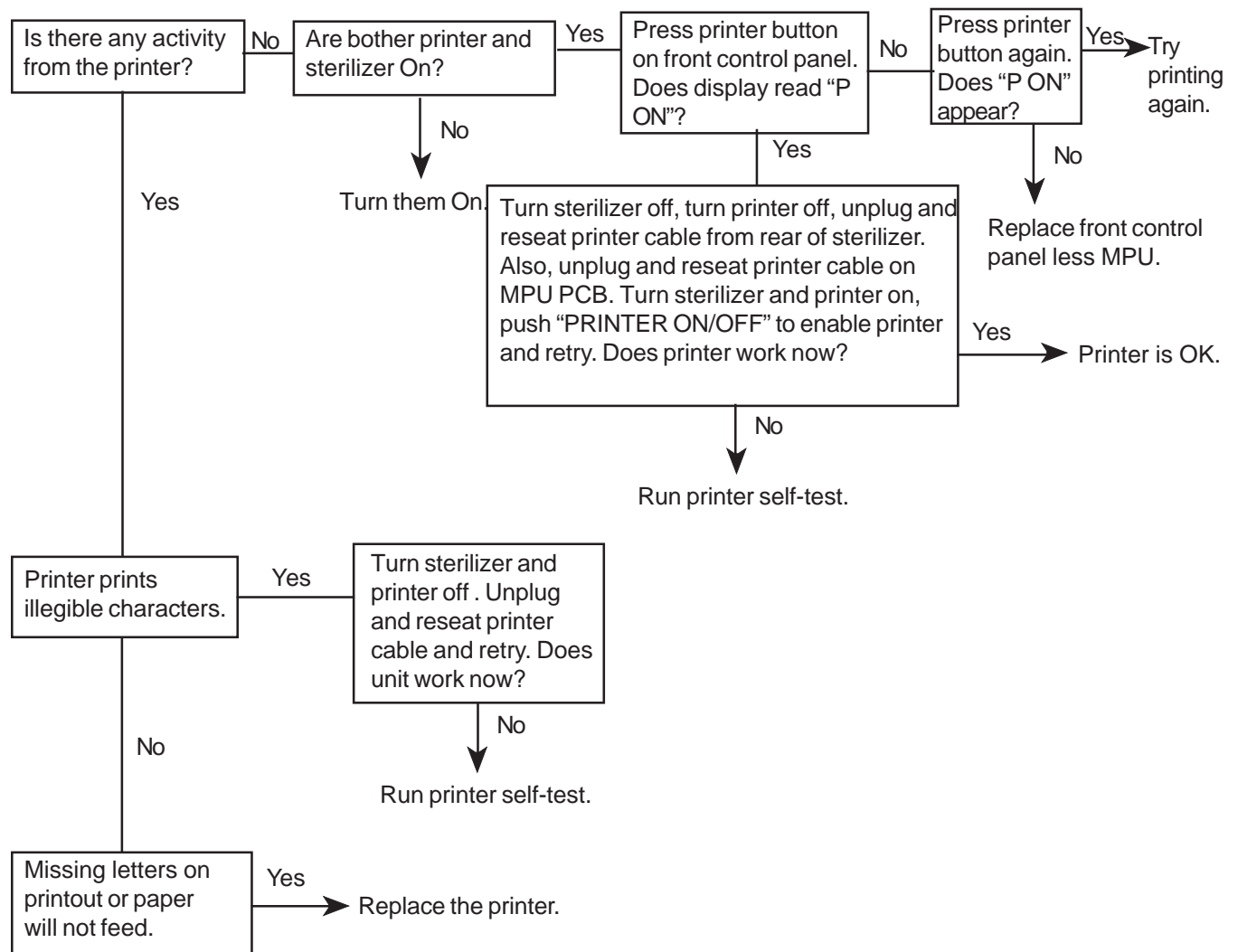


Figure 40.-Siemens 115V



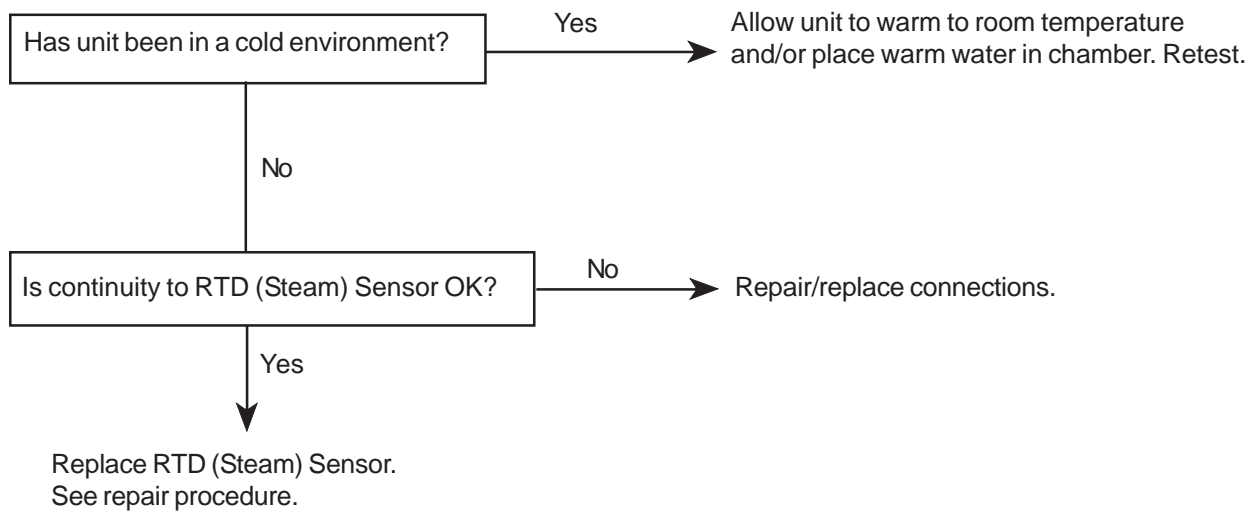
**Printer Self-Test**

1. Turn Off the printer and sterilizer.
2. Unplug the printer from the sterilizer.
3. Hold down PF (Paper Feed) button on printer and turn printer switch to "ON".
4. The printer is now in Test Mode and should start printing exclamation marks, numbers and the alphabet, in proper sequence.
5. If the printer is functioning properly, turn it to "OFF". If not, it is defective.
6. Turn the printer back to "ON" position and reconnect it to the sterilizer, making sure that the interconnect cable is properly seated on both ends.
7. Press the "PRINTER" button on the sterilizer front panel. If the display reads "POFF", press one more time. Display will read "P ON."
8. Unit is now ready for use. If the printer continues to fail, check the continuity of the three wire cable from the MPU PCB, the printer jack and the interconnect cable.
9. Repair or replace as needed.

---

**Troubleshooting****SS-1**

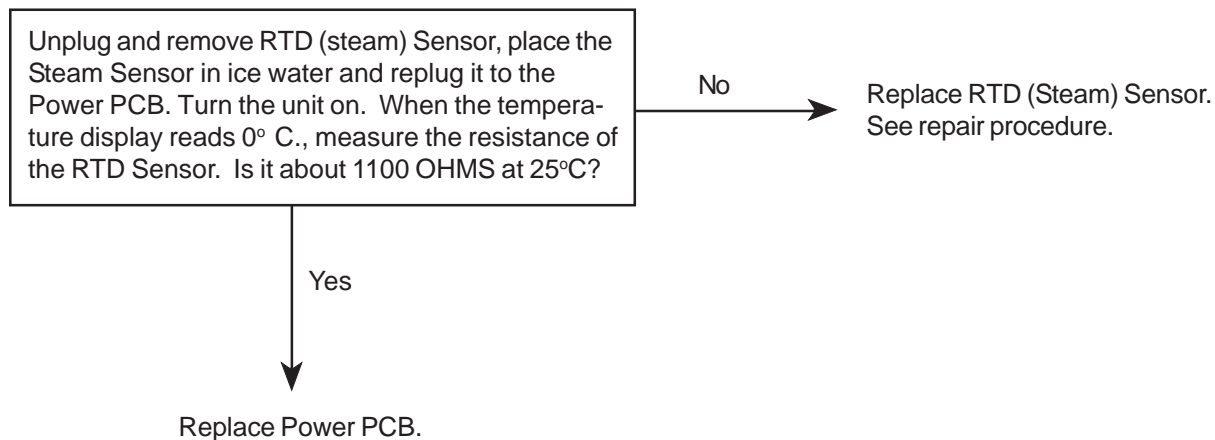
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**Troubleshooting****SS-3**

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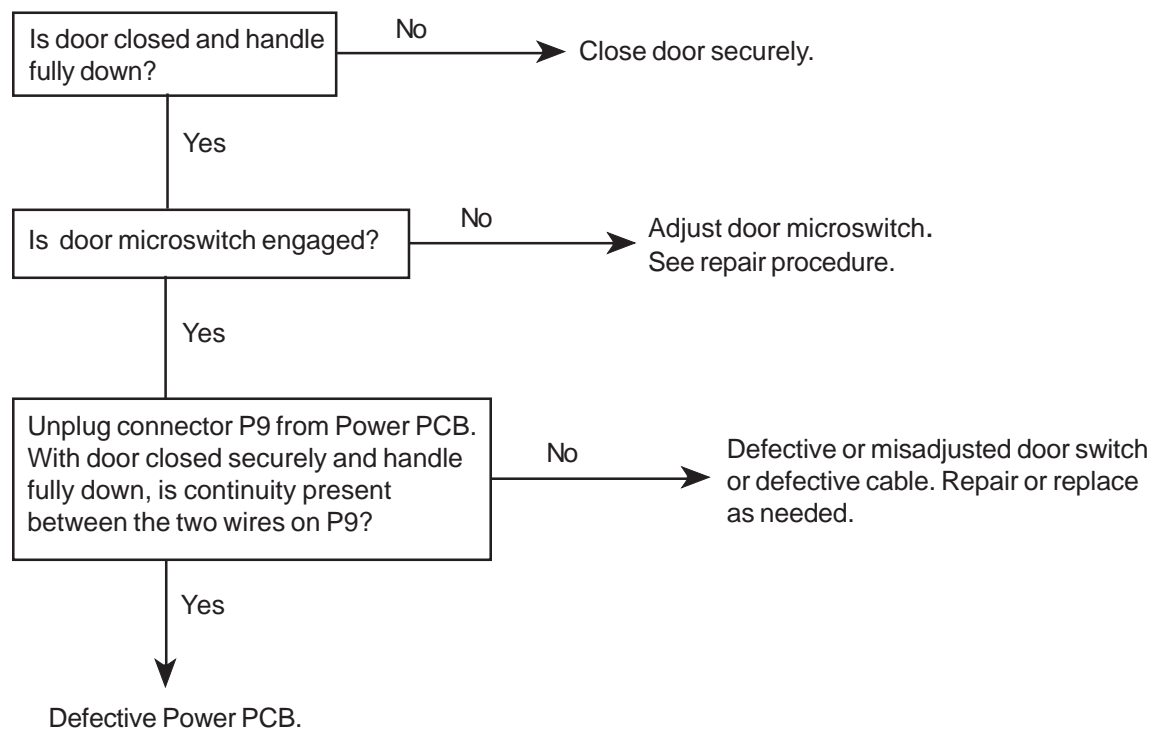


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**Troubleshooting****Lb**

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Replace Front Panel MPU PCB.  
See repair procedure.



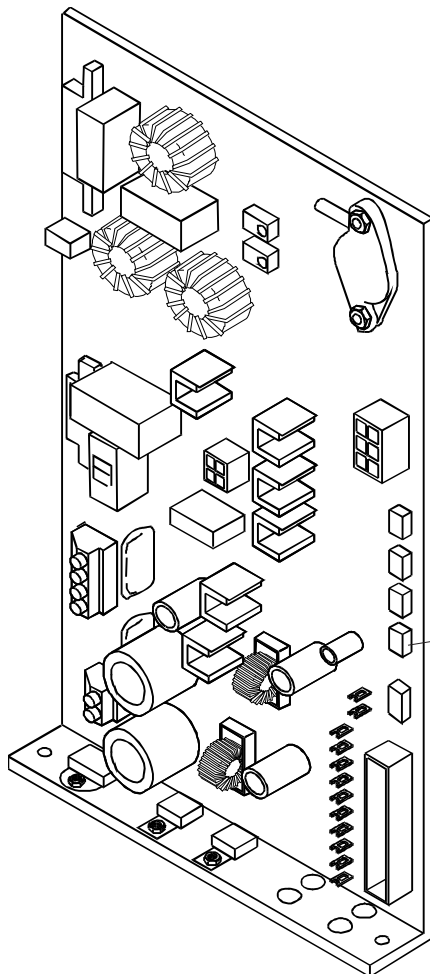
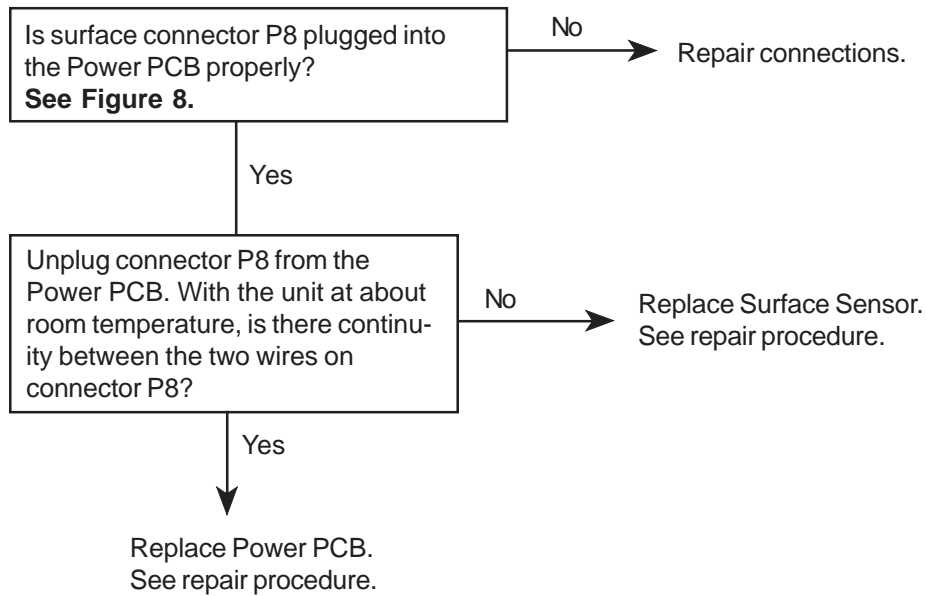
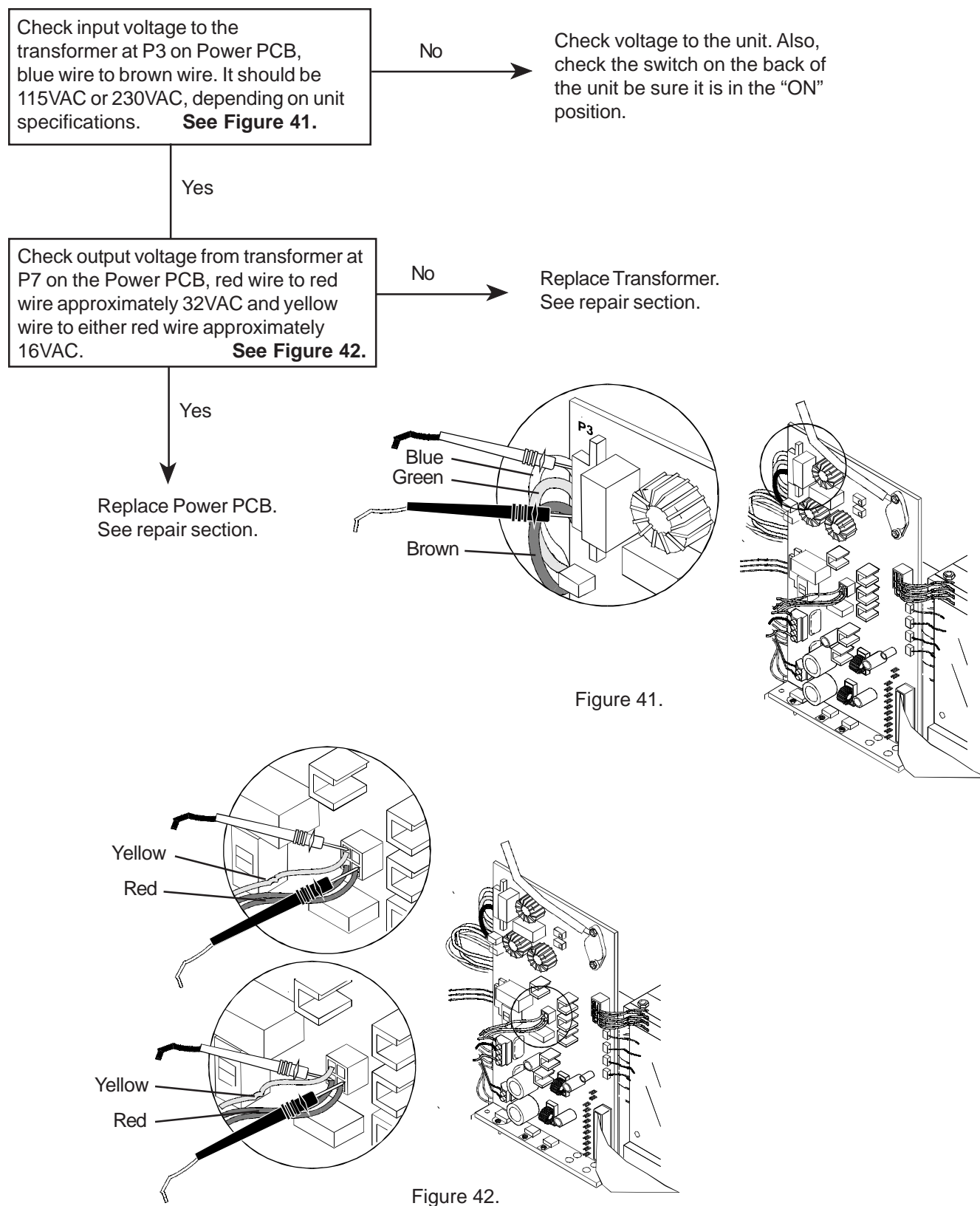


Figure 8.





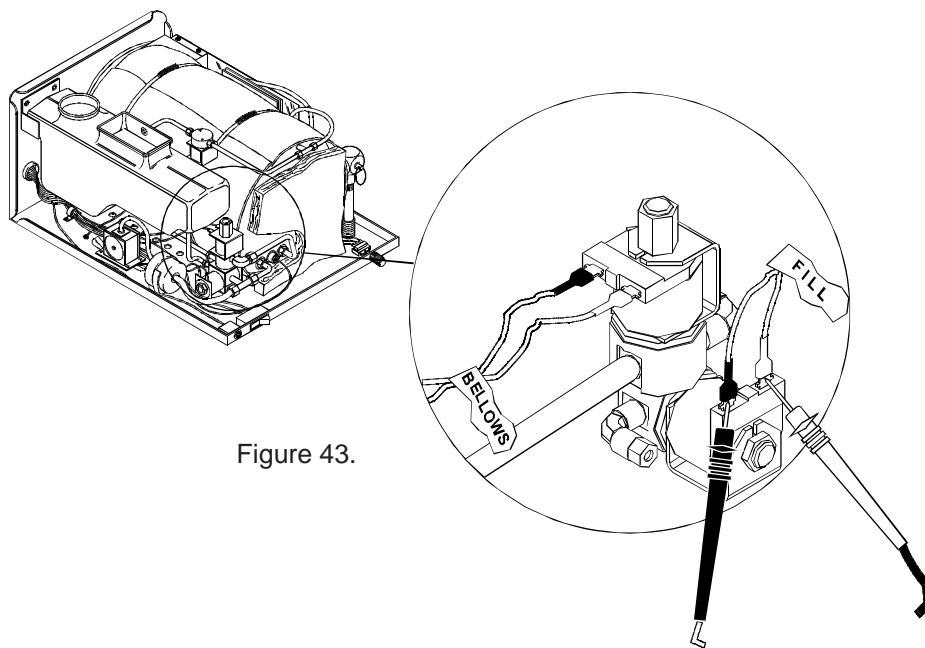
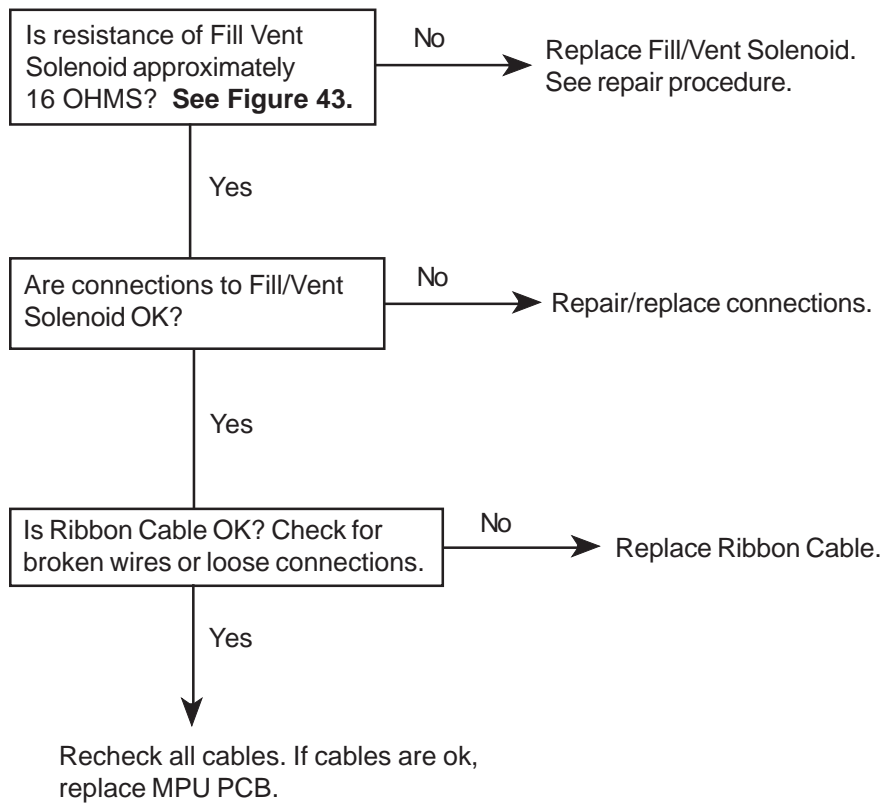


Figure 43.

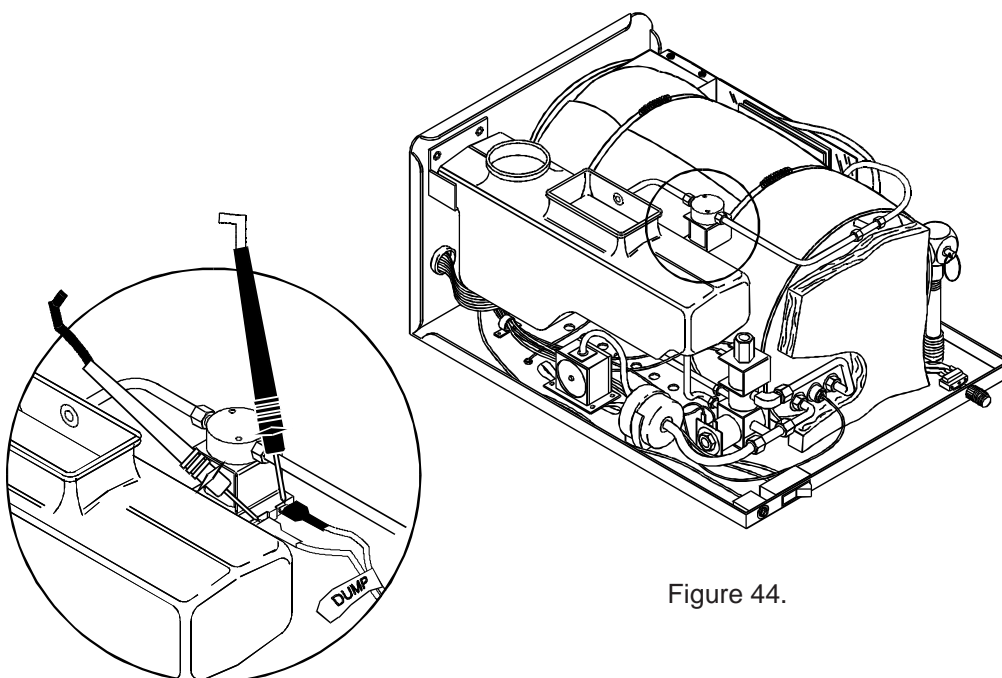
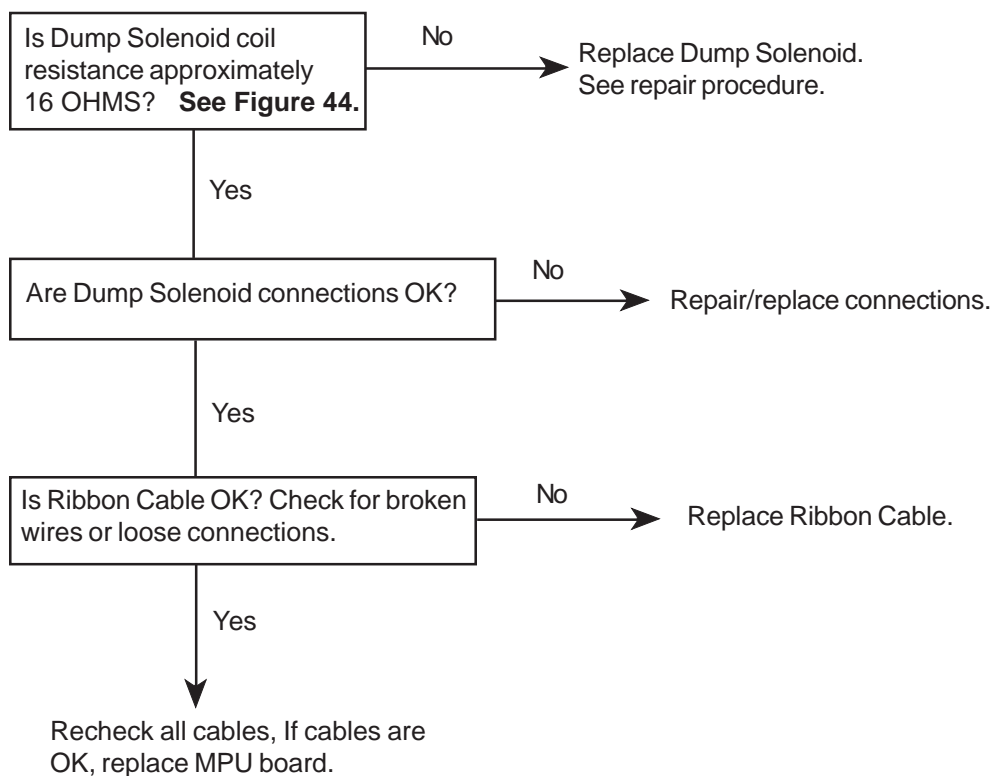


Figure 44.

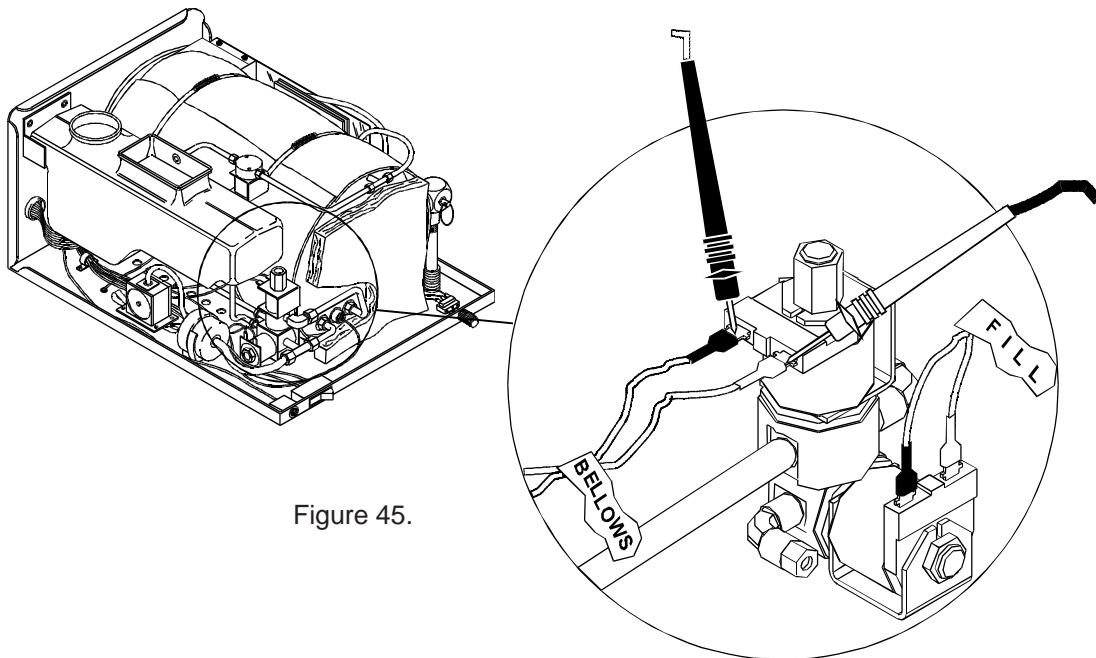
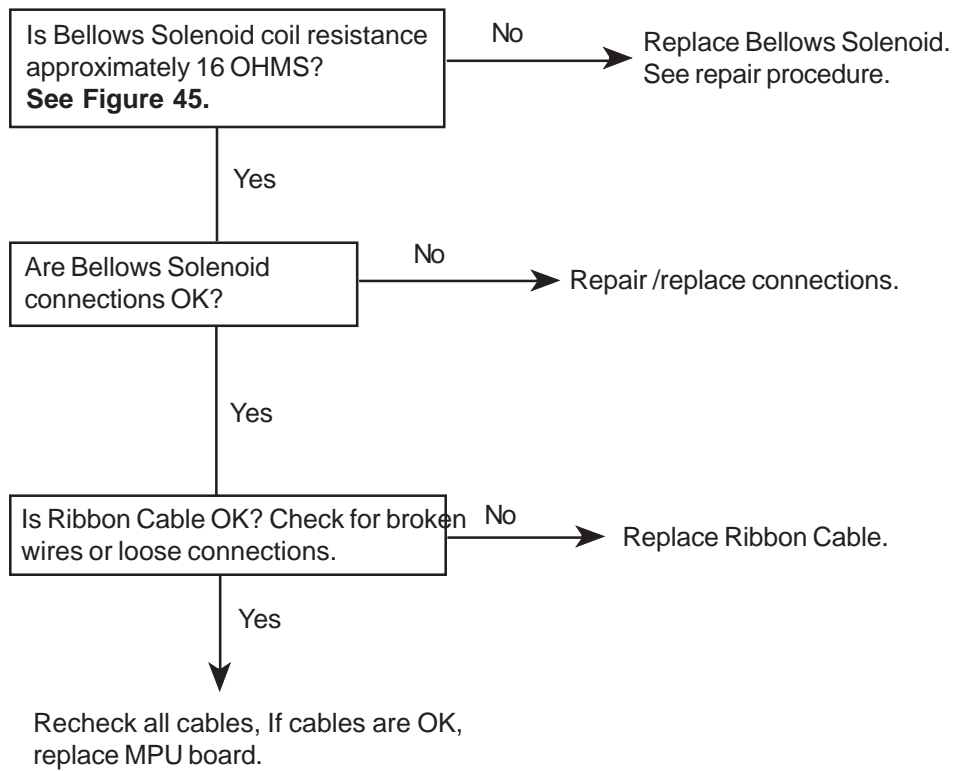


Figure 45.

### General Ordering Information

<i>Customer Service (8 A.M. - 6 P.M. EST)</i> .....	<i>1-800-659-6560</i>
<i>Customer Service Fax Orders</i> .....	<i>1-800-659-7255</i>
<i>Technical Support (8 A.M. - 6 P.M. EST)</i> .....	<i>1-800-659-5922</i>
<i>Technical Support Fax</i> .....	<i>1-704-659-7255</i>

*Customer Service Fax Orders* ..... 1-800-659-7255

*Technical Support Fax* ..... 1-704-659-7255

## Purchase Information

Write in the model and serial number below for the dental chair.

SERIAL NUMBER:

DATE INSTALLED: \_\_\_\_\_

DEALER NAME AND ADDRESS:

## Notes

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

[illegible]

# *Pelton & Crane*

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PO Box 7800  
Charlotte, NC 28241-7800  
USA

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We reserve the right to make any alterations which may be due to any technical improvements.

Part No. 042280  
Rev. 0, 03/05

Printed in USA